

JOURNAL of FARM ECONOMICS

OCTOBER, 1933

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JOURNAL of FARM ECONOMICS

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A THEORY OF THE VARIATION OF COSTS*

JOHN A. HOPKINS

IOWA STATE COLLEGE

Principle: Costs per unit of production tend to vary, by proportionate rather than absolute amounts. Consequently, when logarithms of a sample of costs per unit of product are incorporated into a frequency distribution it tends to conform to the normal frequency curve.

In reading the chapter on Variations in Costs in Bennett's Farm Cost Studies in the United States¹ several months ago, I was very forcibly struck by the similarity of pattern in the several graphs shown. It occurred to me that this same form of distribution appears in nearly all distributions of figures purporting to represent costs per unit of production. In spite of the fact that these figures appeared to have little if any practical usefulness, curiosity led to a further examination of several of these arrays to see if, by any chance, their patterns all possessed a definite and perhaps significant form.²

The first step consisted in plotting the arrays of costs shown on pages 76 and 77 of Bennett's book on semi-logarithmic graph paper so that the scale of costs ran along the proportional or logarithmic scale while the frequencies were measured on the arithmetic or absolute scale. The result was a series of graphs which conformed roughly to the shape of the normal frequency distribution. Later these arrays were regrouped into classes at intervals of equal *percentages* rather than equal absolute

* Journal paper No. J126, Iowa Agricultural Experiment Station.

¹ Bennett, Merrill K. Farm Cost Studies in the United States, Food Research Institute, Stanford University, 1928. Chap. V, pages 75-79.

² I wish to disclaim any intention to enter, via this article, into the old argument whether farm "cost" figures are theoretically sound or practically useful. I think they are sound only if used for certain very limited purposes and it is clear that they are of much less use than the expense of their collection and computation, at least as far as farm management is concerned. For the present purpose it is only necessary that they be related in some definite way to the aggregate of inputs per unit of output so that they may serve at least as approximate indices of the variation of input as between the farms in a given group.

amounts with, of course, the same graphic effect.³ For this purpose the original cost arrays were obtained from the Department of Agriculture through the kindness of Dr. C. L. Holmes. The results are shown a little later in this article.

It was easier to test some of the implications of the principle stated above by an examination of data from similar cost studies where it was possible to examine all the different steps taken in arriving at the final figures. The records of a study of the costs of corn production and one of the cost of hog production, both carried on in Iowa, were utilized for this purpose.

The Theory Refers Only to Homogeneous Conditions of Production

It should be made clear that the theory presented here has reference only to that variation which occurs under essentially homogeneous conditions. Where cost figures are combined indiscriminately from several different soil types, from various years or from various climatic conditions it is impossible to predict, and unreasonable to expect that any particular form of distribution will result. Unfortunately, this was what was done in Mr. Bennett's book and in the graphs in bulletins from which his data were taken.

The first step, therefore, was to express each individual cost figure as a percentage of the average for the county in which it occurred and for the particular year in question. This resulted in the various distributions assuming a much more uniform and less ragged appearance.

In the Iowa corn study it was found that data from Van Buren county showed a much wider dispersion than any other and gave evidence of possessing more than one mode. A further investigation showed that there was a period of very wet weather in this county in the year for which the data were obtained. In low, level fields some of the corn was drowned out. Following this, lowland fields become very weedy. On the higher, sloping land the wet weather had but little effect.

In the array of cotton costs, a wide and erratic dispersion was

³The general mechanics of setting up the classes was as follows: First the arithmetic mean of the logarithms of the series was taken. The middle class was centered on this mean of logarithms, with limits of the mean plus and minus log. .03035; that is the entire width of the class was log. .0607. Intervals of other classes were obtained by adding or subtracting log. .0607 successively from either of these two limits.

This gives us a series of class intervals each of which is 15 per cent wider than the next lower interval, using the lower limits of the respective classes as the bases. If this process were carried out in terms of absolute numbers we might have, as an illustration, a class with its lower limit at 50 cents and its upper limit at 57.5 cents, thus with an interval of 15 per cent. The upper limit of the next class would be 15 per cent greater than 57.5 cents and would be \$66.125. Thus the intervals become wider as the values increase, but widen out in the same proportion of 15 per cent.

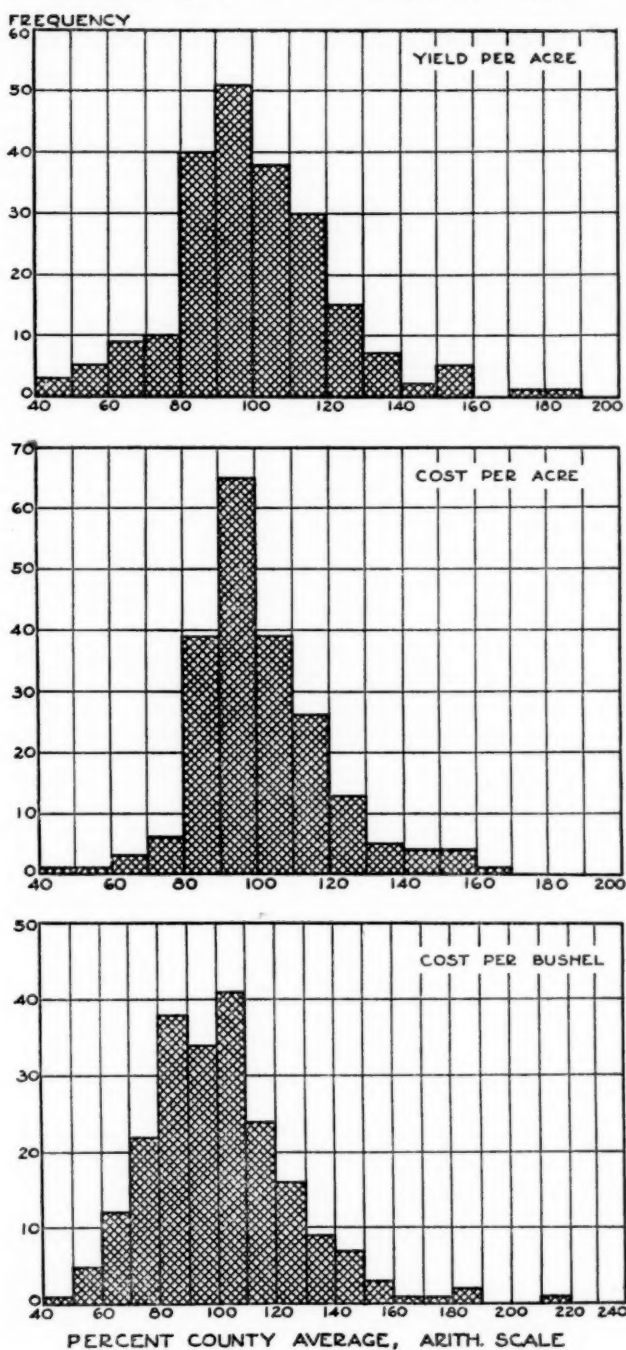


FIGURE 1.—Variation in Corn Yields, Costs per Acre and per Bushel, Arithmetic Scale

found in the figures for Dale and Tallapoosa counties, Alabama, while the figures from the other eight counties behaved in quite regular fashion. U.S.D.A. Bulletin 896 mentions a wide range of temperature and weather conditions in Alabama the year this study was made. Consequently, it was thought that there may have been seriously heterogeneous conditions in these two counties. To repeat, the theory advanced here refers only to homogeneous conditions.

*Statistical Tests of Symmetry on Logarithmic Scale**

The data at hand give us nine series to which tests of symmetry may be applied. The results of logarithmic grouping are shown in tabular form for the corn and hog cost series in Table 1 and for the other products in Table 2. The effects of changing from an arithmetic to a logarithmic distribution are shown in figures 1 to 3.

The gamma tests were used as a means of testing the normality of these distributions.⁵ This involved the computing of two terms for each series. The first of these, γ_1 , measures deviation from symmetry. The second, γ_2 , tests the shape or height of distribu-

TABLE 1. LOGARITHMIC DISTRIBUTIONS OF COSTS OF CORN AND HOGS IN IOWA

Corn			Hogs		
No. Counties	5		2		
Years of Study	1925 to 1928		1922 to 1927		
	Cost per Acre	Cost per Bushel	Cost per Pig to Weaning	Cost per 100 Pounds Gain after Weaning	Cost per 100 Pounds all Marketable Pork
Class ^a -5	1	1	2	—	—
-4	1	5	3	—	1
-3	3	10	7	7	5
-2	15	23	17	18	23
-1	50	44	37	26	27
0	81	51	34	55	47
+1	40	43	27	26	30
+2	17	23	16	17	14
+3	8	11	8	6	6
+4	1	3	3	1	3
+5	—	1	0	—	—
+6	—	1	3	1	—
+7	—	—	—	—	1
No. cases	216	216	157	157	157
γ_1	-.010 ± .166	.010 ± .166	.363 ± .192	.407 ± .192	.625 ± .192
γ_2	1.968 ± .330	.407 ± .330	.928 ± .385	.910 ± .385	1.553 ± .385
γ_1 omitting one extreme observation				.052 ± .195	.108 ± .195
γ_2 omitting one extreme observation				-.176 ± .386	.056 ± .386

* Classes are at intervals of 15 per cent, i.e., at log. intervals of .0607, except cost per pig to weaning, which is at intervals of 25 per cent.

⁴ In this Section I wish to acknowledge the valuable assistance of Professors E. S. Allen, G. W. Snedecor and A. E. Brandt of the Department of Mathematics, Iowa State College, and also of Professors B. D. Mudgett and W. C. Waite of the University of Minnesota, who made valuable suggestions regarding some of the implications of the theory.

⁵ For a description of these tests see Fisher, R. A., *Statistical Methods for Research Workers*, pages 52-54. London, 1932.

tion. The values of these terms for the nine series are shown in tables 1 and 2. In considering these tests it should be remembered that they are rather highly sensitive, since the dropping of a single erratic case sometimes made the difference between a strongly significant degree of skewness and a decidedly non-significant degree, and also sometimes between a significant and non-significant γ_2 .⁶

When the γ_1 test is applied to the logarithmic distributions it is found that the costs of corn per acre and per bushel, the cost

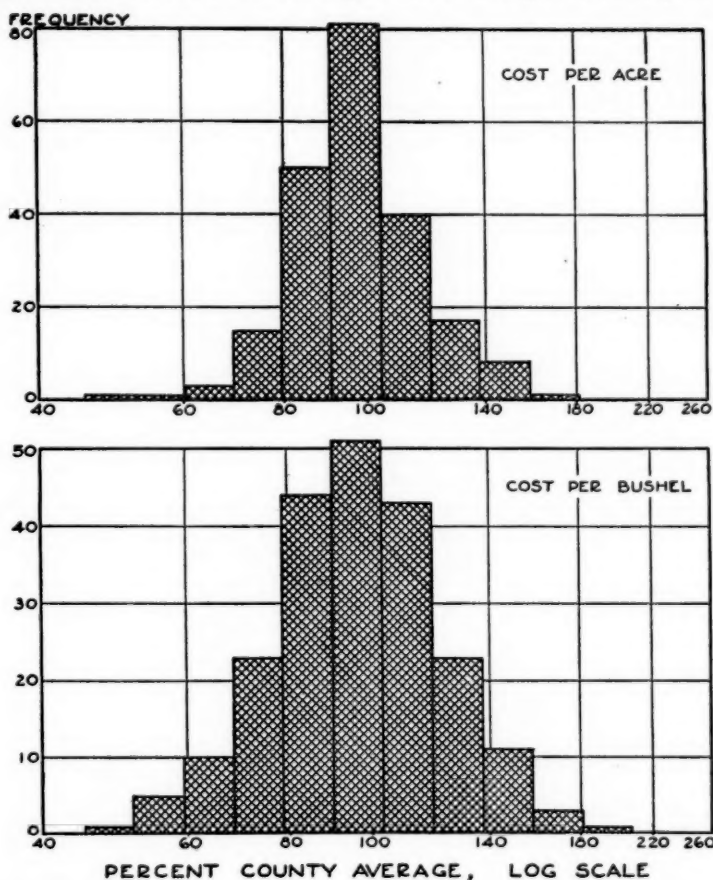


FIGURE 2.—Variations in Corn Costs per Acre and per Bushel, Logarithmic Scale

⁶The purpose of the gamma tests is simply to ascertain whether the deviations of these frequency distributions from the normal form are such as might be explained by chance variations. There has been developed here a theory which, it is thought may explain the peculiar form of distribution which the cost figures assume. If this theory is valid then their logarithms should assume a normal frequency distribution. The gamma tests help by informing us whether this particular criterion has or has not been met. But the gamma tests do not demonstrate that the theory advanced is the only one under which this criterion would be met. The reasons for selecting this particular theory are dealt with in a subsequent section.

of pigs to weaning and the total costs per hundred pounds of marketable pork, are symmetrical well within the permitted limit of twice the standard error of γ_1 .

The logarithmic distribution of cost of gains on pigs after weaning is skewed towards the higher values by barely enough to exceed twice the standard error. The skewness becomes insignificant if we drop one extremely high cost case representing a farm on which 55 per cent of the pigs were lost before weaning. In this case, effects of disease seem to have carried over into the fattening period and resulted in extremely poor gains on pigs which survived. This case was certainly not "homogeneous" with farms with little or no disease loss.

The same methods applied to the costs of cotton, potatoes, spring and winter wheat mentioned by Bennett, give the results shown in Table 2 and Figure 3. With the omission of three extremely low cost cases in cotton, and one extremely high cost figure from the winter wheat costs, each of these distributions assumes a symmetrical form. That is to say, the deviations fall within the permitted range of twice the standard error of γ_1 . Considering the wide range of soil conditions and precipitation commonly occurring in a county within a given year, and considering that no attempt was made to discriminate between con-

TABLE 2. LOGARITHMIC DISTRIBUTIONS OF COSTS OF FOUR CROPS

Crop No. Counties No. States Year of Study	Cotton ^a 8 4 1918	Potatoes 9 5 1919	Winter Wheat 9 3 1919	Spring Wheat 5 3 1919
Class ^b -8	3	—	—	1
-7	—	—	—	1
-6	—	1	1	—
-5	10	3	3	2
-4	8	9	4	3
-3	36	32	8	13
-2	56	54	34	23
-1	123	89	58	43
0	161	99	75	36
-1	132	85	57	36
-2	87	41	26	15
-3	26	24	10	10
-4	17	13	3	7
-5	3	9	2	4
-6	1	1	2	1
-7	—	1	—	1
-8	—	—	—	1
-9	—	—	—	—
-10	—	—	1	—
Totals	663	461	284	197
γ_1	-.446 ± .095	.293 ± .114	.620 ± .144	.255 ± .173
γ_1	1.428 ± .190	.366 ± .227	3.750 ± .288	1.520 ± .345
γ_1 omitting erratic cases	-.152 ± .095		.100 ± .145	
γ_1 omitting erratic cases	.397 ± .190		1.305 ± .288	

^a Omitting Dale and Tallapoosa counties, Alabama.

^b For explanation of the class intervals see footnote No. 3.

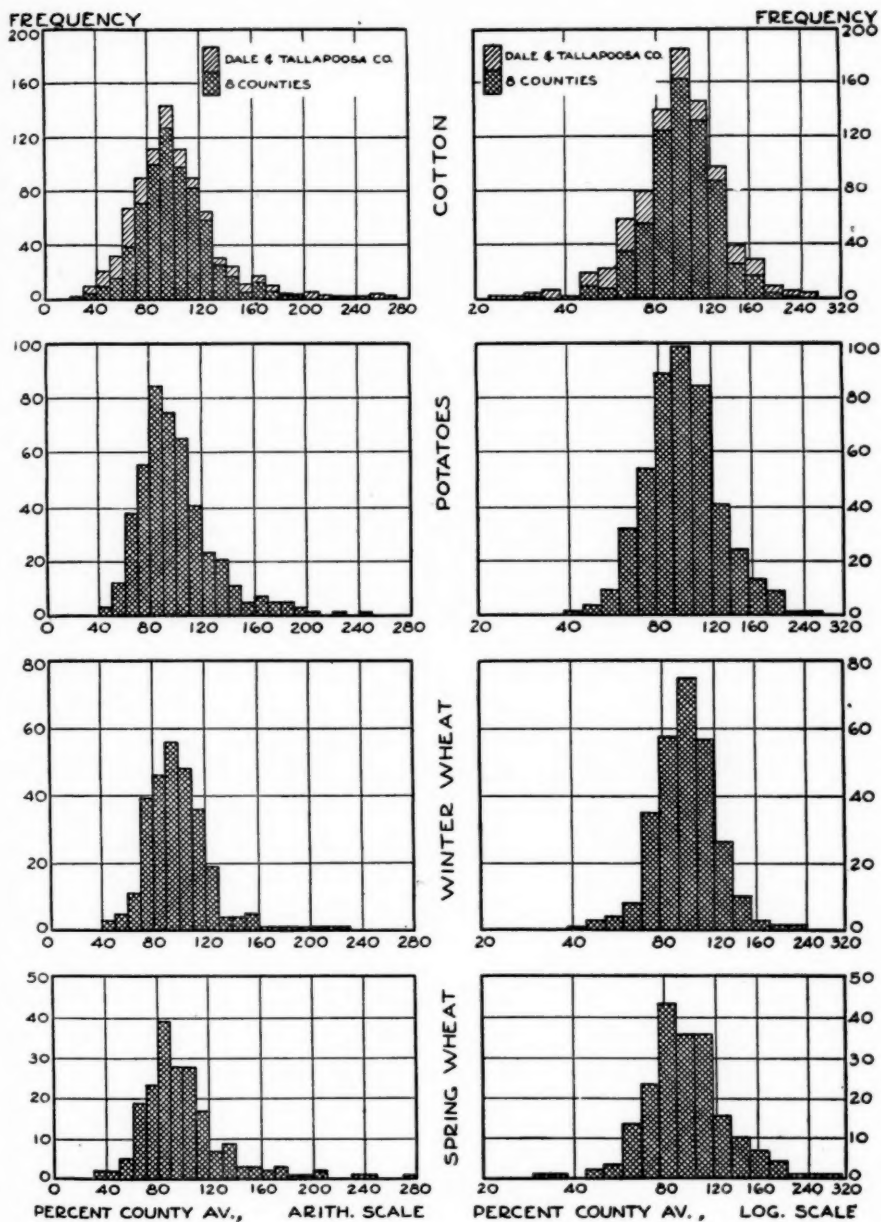


FIGURE 3.—Variation in Costs per Unit of Four Crops

ditions of production further than by the use of county averages, it is surprising that symmetry is approached so closely in these data.

When the γ_2 was computed to test the shape or height of the distributions it was found to be less than the limit of twice its standard error with the costs of corn per bushel, and the costs of potatoes. Each of the other distributions yielded a positive γ_2 which exceeded the permissible limits.

Since the γ_2 was positive in each case, it indicates a high, peaked form of distribution with a greater than normal number of extremely high and low values. The heterogeneous conditions represented explain this form of distribution.⁷ In three of the seven distributions which had significant values of γ_2 it was found that dropping one erratic case from each array reduced the γ_2 to insignificance. In one other case, the cost per pig to weaning, the original γ_2 was only 2.4 times its standard error.

Some Implications of the Theory

It has been suggested that the skewness occurring in the cost figures might have been introduced by mechanical means. For instance, the form of distribution might have been different had the data been expressed in terms of the number of bushels produced per dollar instead of the cost in dollars per bushel.

It cannot be denied that all data are subject to influences of this type. In a sense, every distribution is subject to such "mechanical" influences. Thus a logarithm is, in a sense, a mechanical device. The selection of equal arithmetic intervals or of class intervals which vary in some particular manner influences the form of the resulting distribution. It is impossible to evade the fact that a choice of some one out of the various means of expression must be made.

The important thing is to select that particular mode of expression which shows most clearly the influences affecting the data at hand.

In addition to the mathematical tests there is another reason for concluding that a principle of proportional rather than absolute variation is at work in this case. No difference in the form of distribution results from the expression of these data in terms of, for instance, costs in dollars per bushel rather than as bushels produced per dollar. The same form of distribution results in

⁷ It is possible that a normal distribution would also have been obtained had the samples been large enough to represent proportionately all the different methods and conditions of production. Since the samples were not adequate for this, we can be reasonably confident of the form of distribution only under essentially similar methods and production conditions.

either case. By the use of equal logarithmic class intervals, or of proportionate arithmetic intervals as described above, we obtain equally symmetrical distributions of the cost figures and of their reciprocals—the number of units produced per dollar of cost.^a

The proportionate or logarithmic form of distribution is the only one which possesses this property of yielding a symmetrical distribution both from the logarithms of the original data and also from the logarithms of their reciprocals. In other words the distribution of cost figures as we find them in dollars and cents, does not merely exhibit skewness. Mere skewness is a matter of no particular importance here. These figures possess a very definite degree of skewness—that which characterizes geometric progressions.

The next question is, how can this particular form of distribution be explained?

Sequences of Operations May Cause Some Skewness. The indices of cost per unit of a crop are the quotient of the cost per acre and the yield per acre. Figure 1 shows that the distribution of yield of corn was skewed towards the right on the natural scale but not sufficiently to assume the normal shape on the logarithmic scale. On the logarithmic scale the cost per acre was slightly, though insignificantly, skewed to the left, while the cost per bushel was insignificantly skewed to the right. The cost per bushel is affected by all the influence that affect either yield or cost per acre.

In the production of hogs we have a somewhat similar case. The variation in costs per hundred pounds of gain after weaning rests partly on influences which do not affect the costs to weaning. But also the rate of gain when pigs are fattening, and consequently the cost, is influenced by the condition of the pigs when they are weaned. The total cost of pork produced combines all these influences both before and after weaning. It is shown in table 1 that the skewness of cost of gain after weaning is greater than skewness of cost before weaning and is still greater with total cost per hundred pounds of marketable pork.

In other words these data contain a suggestion, though it is by no means conclusive, that the dispersion and skewness increase with the number of influences to which a distribution is subjected. Most production processes consist in a long chain of operations. Neglect or misfortune at any one step is likely to affect sub-

^aThis can be explained by saying that proportionate intervals are expressed by equal variations in logarithms. Now the logarithm of a reciprocal is simply the negative of the logarithm of the original number. Therefore the logarithms of the reciprocals are also separated by equal intervals, and in this case, the reciprocals must assume a proportionate distribution.

sequent steps unfavorably. Consequently the nearer we get to completion of the production process the farther figures representing costs up to that stage are likely to scatter out towards the higher values.

At the same time it must be recognized that many of the observations which deviate most widely from the mean of the series represent unusual or heterogeneous conditions of production. Further study and a more careful discrimination between soil, weather and other conditions would be necessary to separate the effects of heterogeneity from those increases in dispersion which come from the longer chain of production processes.

Multiplicative Combinations of Efficiencies. A second possible source of skewness may be found in the principles governing the combination of efficiencies of production factors. There are wide variations in efficiencies of entrepreneurs and these vary from time to time with each individual. With these are combined varying efficiencies in the factors of production.

Now if the efficiencies of farm entrepreneurs varied in a manner described by a normal arithmetic distribution, if efficiencies of other factors of production varied in a similar manner, and if factors of production were combined at random with the *addition* of efficiencies, we should obtain another normal arithmetic distribution. But if the efficiencies of factors were combined in a *multiplicative*⁹ rather than an additive manner we should obtain a skewing towards the higher values which might approach the logarithmic form. It is not suggested that the combination of factors is exactly described by the multiplication of their efficiencies. But high efficiency in one factor certainly seems to reinforce high efficiency in another.

Variations in Natural Advantages. The variations in natural advantages under which different farmers operate provide another possible cause for variations in cost figures. Differences in soils, climate, topography, or location, might be expected to lead to a normal arithmetic variation in costs of crop or livestock products as between different farms.

But with the natural factor in production are combined various man-made factors and these are coordinated by entrepreneurs, having varying efficiencies and capacities. If an entrepreneur fails to adjust himself to the natural conditions of his farm, this may nullify the advantages of efficient equipment or labor, or lose the benefits of an otherwise effective business organization.

⁹ See Taylor, H. C. *Agricultural Economics*. 1905 edition, pp. 60-61. See also Black, John D. *Production Economics*. 1926. Chap. XIII, especially pages 363-370.

Thus if the efficiencies of the entrepreneur and the man-made factors of production are combined with the natural peculiarities of each different farm in a multiplicative or other manner more complex than the additive, we have here another possible source of the degree of skewness found in the cost distribution.

Increasing Resistance to the Lowering of Cost. The past few paragraphs can be summed up by saying that, from various sources the reduction of cost encounters an increasing resistance while there is little immediate resistance to inefficiency. Therefore, even with an individual entrepreneur, proportional variation would be expected as between different operating periods if he applied himself to his business with varying intensity of effort.

This may be more obvious if we can conceive of managerial effort as being applied in a series of equal units. Let us imagine a farmer who has been producing potatoes at a cost of \$1.00 per bushel. Suppose that he applied one added unit of managerial effort to achieve greater economy and thereby reduces cost by 10 per cent, or to 90 cents. Now let us suppose that he applies a second unit of effort in the same direction. In accordance with the theory proposed, the second reduction of costs should be 10 per cent of the remaining cost, and not another 10 cents. The first effort may be regarded as overcoming some of the more obvious causes of wastefulness. After this, fewer causes remain and these are probably more difficult to overcome.

Conclusion

In conclusion, the available data seem to conform closely to the theory that costs vary between different producing units in a proportionate rather than absolute manner. The logarithmic or exponential form of distribution is not rare. It commonly occurs, as in the present case, where the values approach a limit in one direction but where there is no definite limit in the other.¹⁰

To say that costs per unit are skewed toward the higher values is simply to say that it is easier to be careless and wasteful than to economize. But to demonstrate that the cost distributions which are skewed on an arithmetic scale assume the normal shape on a logarithmic scale, is to set up a much more definite criterion of cost distributions. This implies that in any given enterprise, operating under a given set of conditions, there is a definite rate of resistance.

¹⁰ Davies, Geo. R. The Logarithmic Curve of Distribution. Jour. Amer. Stat. Assn. December 1925, Vol. XX, p. 467-480.

It has been suggested that there are variations in abilities of entrepreneurs between different men and from time to time in the same man. It has been suggested that there are varying efficiencies in labor and in equipment, and also that there are varying resistances opposed by nature to man's productive effort. It is not clear that any one of these causes for variation would in itself give rise to a proportionate variation in costs. It seems more likely that this form of variation is more closely connected with the principles which govern the combination of factors of production, or perhaps of the combination of the man-made and controlled factors on the one hand and the varying resistances of nature on the other.

What is the lesson which this theory yields for the practical man? If costs vary in a proportionate manner as between different entrepreneurs, it seems likely that they may vary in the same manner with the application of varying effort to a given enterprise by an individual producer. In this case a series of added units of effort directed towards the attainment of greater economy should yield a series of equal proportionate rather than equal absolute reductions in cost. Thus to revert to the example of potato costs, if each added effort lowers cost by ten per cent, the variation in cost after successive efforts at economy would be \$1.00-90c-81-72.9-65.6-59-53.1-47.8-43c until it became questionable whether further cost reduction would be worth striving for.

Heretofore, the familiar arrays or frequency distributions of costs have been presented by research workers without comment on the form which they assume other than the ambiguous statement that they "show wide variation." In the classroom also, the teacher has contented himself with pointing out the mere facts of variation. The theory presented here should serve two ends. First it gives us a normal pattern into which we may expect cost observations from large numbers of cases to fall. In the second place it affords some basis for predicting the effects of successive applications of managerial effort designed to increase efficiency and reduce cost.

Under the qualification that the theory refers only to homogeneous or nearly homogeneous conditions, and with the corollary that even wider variations may occur in case of compound production processes, such data as were available have supported the theory remarkably well. But the implications of the principle are not all worked out, and so far there are only *a priori* explanations why the costs should vary in just this manner. It is to be hoped that other workers will test the theory further.

A STUDY OF EGG PRODUCTION PER HEN IN CENTRAL UTAH¹

ORIS V. WELLS AND MARION CLAWSON

BUREAU OF AGRICULTURAL ECONOMICS

The individual poultryman is necessarily interested in such questions as: What is the relation between the quantity and kind of feed fed and the egg production obtained? What is the relation between the breed or quality of the stock and the product obtained? What is the relation between certain practices and methods of feeding and handling and the product obtained? Although such relations are admittedly biological, their economic importance is self-evident. In order to budget, poultrymen must be able to estimate the quantity and composition of the feed to be fed and the egg production to be expected as well as the price situation. And to be worth while such estimates must be based upon reliable information of the type indicated above. Since such information is usually unavailable, or must be guessed at, an attempt will be made in this paper to present an approximate answer for the first question given above for poultrymen in central Utah, to evaluate the method used in the study presented, and to indicate how a more exact or useful answer might be obtained.²

The data used were for commercial egg-producing flocks of white Leghorns located in the central valleys of Utah. Although obtained by the survey method, the data were believed to be quite accurate. Almost all the producers sold their eggs through the Utah Poultry Producers Association so that accurate monthly records of the number, grade, and value of eggs sold were available. And since all of the producers purchased at least 50 per cent, and in many cases more than 90 per cent, of their feed, weekly feed purchase slips were often available.

The data were apparently drawn from a homogeneous universe. Although the absolute range was from 200 to 5,000, the number of pullets and hens in the laying flock was usually between 300 and 1,000. All of the poultrymen bought their chicks from some commercial hatchery and, as far as could be judged, the average productive efficiencies and capacities of the several lots of young chicks were approximately equal. Since almost all

¹The data used in this study were obtained in the execution of a cooperative project by the Utah Agricultural College and the Division of Farm Management and Costs, United States Department of Agriculture. Acknowledgment is made to W. P. Thomas, Utah Agricultural College, for permission to use the data in the correlation study here presented.

²Although the discussion in this paper is primarily concerned with the feed-egg production relationship, much of it is also applicable to studies which have been or might be made of milk, pork, or beef production. Studies of the factors affecting milk production are reported in Research Bulletin No. 79 of the Wisconsin Agricultural Experiment Station, in Bulletin No. 270 of the Minnesota Agricultural Experiment Station, and in Bulletin No. 264 of the Montana Agricultural Experiment Station.

of the chicks were bought in March or April the variation in the age factor was not significant. The amount and character of the range allowed was not such as to affect either the feed consumption or egg production of any flock materially. The hens were regularly confined to the laying houses for a large part of the year and lights were commonly used. The type of laying house used was extremely uniform with almost 75 per cent of the houses of a single type.

Almost all the feeds fed were concentrate feeds with approximately equal digestible nutrient values per pound. For the small quantities of skim milk, fresh fish, and green feed fed, concentrate and mash equivalents were calculated. The mash fed was usually mixed by either a commercial mill or a cooperative warehouse and was commonly supposed to contain at least 16 per cent protein. The average composition of the scratch grain was 60 per cent wheat, 20 per cent corn, 10 per cent barley, and 10 per cent other grain. For some flocks, particularly in 1930-31, the scratch grain contained more than 60 per cent of wheat.

There were three methods by which the data might have been analyzed—(1) by simple averaging, (2) by subsorting and averaging, or (3) by the use of simple and multiple correlation. Since net relationships were desired, simple averaging could not be safely used. And although the principles underlying the subsorting and correlation methods are identical, the correlation method was used because (1) the regression-equation description of the average net relationships in question is preferable to the sets of disconnected averages which would have been obtained by subsorting and averaging, and because (2) the degree to which the variance, or the square of the standard deviation, in the dependent factor (egg production per hen) is explained by the regression-equation relationships is measured by the coefficient of determination.

Of the 323 October-through-September records which were available, only 144 carried a complete record of the quantities of feed fed. Of the 144 records which could be used, 30 were for the 1928-29 production year, 41 for the 1929-30 production year, and 73 for the 1930-31 production year. After a number of averages and correlations had been calculated, the 144 records were divided into a group of 7 records for flocks which were made up entirely of old hens, a group of 31 records for flocks which were made up entirely of pullets, and a group of 106 records for flocks which were made up of both pullets and hens at the start of the

laying season. Since the number of records for old-hen flocks was so small, they were not considered further.

Of the 31 all-pullet flock records, 5 were discarded because they were apparently inaccurate and 1 was discarded because of a severe outbreak of disease and consequent drastic reduction in egg production. Of the 106 mixed-flock records, 2 were discarded as inaccurate and 18 because the recorded production was severely affected by an outbreak of disease. As would have been expected, the records for the 19 flocks which were seriously affected by disease consistently showed a lower egg production per hen than would have been expected from the quantity and composition of the feed fed.

Two correlation analyses were completed.³ The factors used in the pullet flock correlation were:

E_p —Eggs laid per pullet, calculated by dividing the total number of eggs produced by the flock by the average (of the 12 monthly averages of the) number of pullets in the laying flock.

F_p —Pounds of feed fed per pullet, calculated by dividing the total quantity of feed fed by the average number of pullets in the laying flock.

M_p —Percentage of mash in the ration, calculated by dividing the quantity of mash fed by the total quantity of feed fed and expressing the result as a percentage.⁴

The factors used in the mixed flock correlation were the same with the exception of an additional factor " P_m ." This additional factor was calculated by dividing the number of pullets on the opening inventory date by the total number of pullets and hens in the flock and expressing the results as a percentage. For eggs laid, the symbol " E_m " was used.

Since it is desirable (1) that the data used in correlation work should be normally distributed, and (2) that there should be no high intercorrelations between any of the independent or causal factors in the multiple-regression equation, frequency distributions were constructed for each factor in question and every possible simple or two-variable coefficient of correlation was calculated. The data for the pullet-flock correlation were quite irregularly distributed. But the data for the mixed-flock correlation, where there were enough cases to give a reliable result, were all approximately normally distributed. The simple correlations

³ For an explanation of the correlation method see: Ezekiel, Mordecai, *Methods of Correlation Analysis*, New York, John Wiley and Sons, 1930.

⁴ The percentage mash factor was used rather than the nutritive ratio because it can be more easily calculated and understood by poultrymen and because it gave as accurate a measure of the ratio as could have been obtained from the data available.

between the independent factors were, as shown in Table 1, all extremely small with the single exception of the correlation of 0.150 between the quantity of feed fed and the percentage of pullets in the mixed-flock data.

TABLE 1. SIMPLE CORRELATIONS BETWEEN THE FACTORS STUDIED

	Feed fed	% Mash	% Pullets	Egg production
<i>Pullet-Flock Data</i>				
Feed Fed	—	-0.019	—	0.466
% Mash	—	—	—	0.385
<i>Mixed-Flock Data</i>				
Feed Fed	—	0.040	0.150	0.650
% Mash	—	—	0.017	0.193
% Pullets	—	—	—	0.413

Since the data to be correlated approximately fulfilled the two requirements discussed above, the next step was to select the type of regression equation to be used. From a theoretical viewpoint, a logarithmic or joint-effect type of equation might be argued for. But since the variation in the data studied was limited and since as significant a coefficient of determination was obtained in connection with the simple additive type of the regression equation as with any more complicated type, the simpler type was selected.⁵ If more accurate and more complete data were available, or if the range of the variation in the data used were much wider than in the present case, some more complicated form of equation might be required.

For the pullet-flock data, a multiple correlation of 0.610 was obtained. The regression equation was:

$$E_p = 1.154 F_p + 0.787 M_p + 43.680$$

For the mixed-flock data, a multiple correlation of 0.742 was obtained. The regression equation was:

$$E_m = 1.308 F_m + 0.360 M_m + 0.572 P_m - 2.020$$

The regression equations are interpreted in Figures 1 and 2. In Figure 1 the broken line represents the number of eggs per pullet which might normally be expected from an all-pullet flock of white Leghorns in Utah with different quantities of feed made up of 50 per cent mash and 50 per cent grain. The solid line represents the number of eggs per hen that might normally be expected from a mixed, 60 per cent pullet and 40 per cent old hen, flock with different quantities of 50-50 feed. The 50-50 com-

⁵For the mixed flock data, the logarithmic type of equation gave a multiple correlation coefficient of 0.730, as compared with a coefficient of 0.742 for the straight-line type. A graphic examination of the residual variation indicated that the coefficient of correlation could not be significantly increased by the use of either curvilinear or joint correlation.

position of the feed ration and the 60-40 composition of the mixed flock have been used because they are approximately average.

The relation between the equations and the chart can be made clear by the consideration of an actual calculation. To calculate

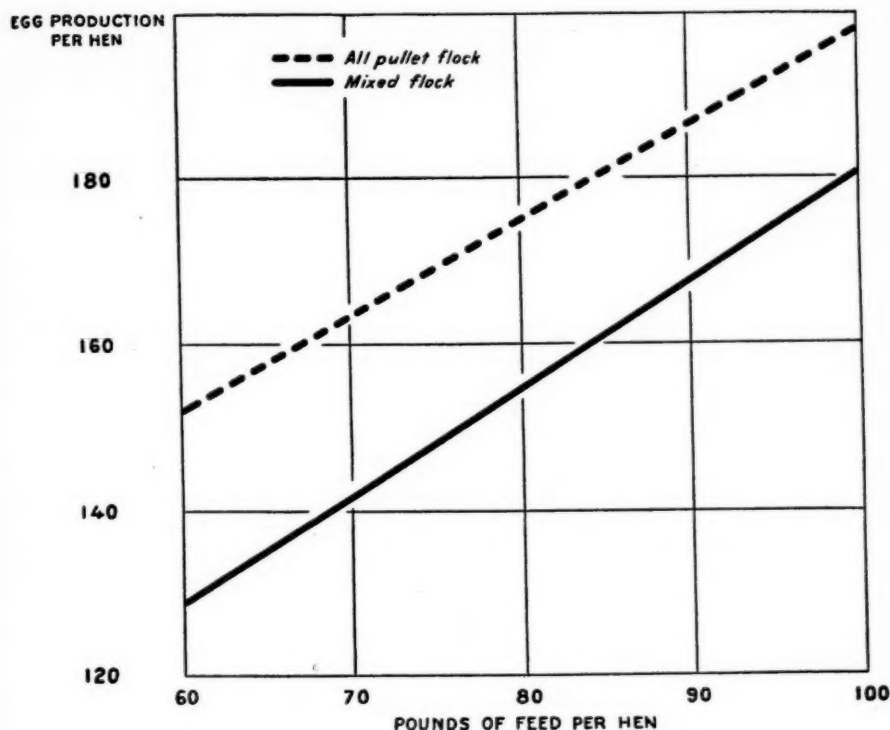


FIGURE 1.—Net Relation between Quantity of Feed Fed per Hen and Egg Production per Hen

the production per hen, for example, of a mixed 60-40 flock which was fed 80 pounds of 50-50 feed, the procedure would be:

$$\begin{aligned} \text{Feed: } 80 \times 1.308 &= 104.64 \\ \% \text{ Mash: } 50 \times 0.360 &= 18.00 \\ \% \text{ Pullets: } 60 \times 0.572 &= 34.32 \end{aligned}$$

These add to a total of 156.96. From this total, the adjusting constant of 2.020 must be subtracted. The net result is a normally expected or predicted production per hen of 155 eggs per year.

The corrections to be made in the estimates from Figure 1 for varying proportions of mash and pullets are shown in Figure 2. If, for example, the feed ration for a mixed flock is 65 per cent

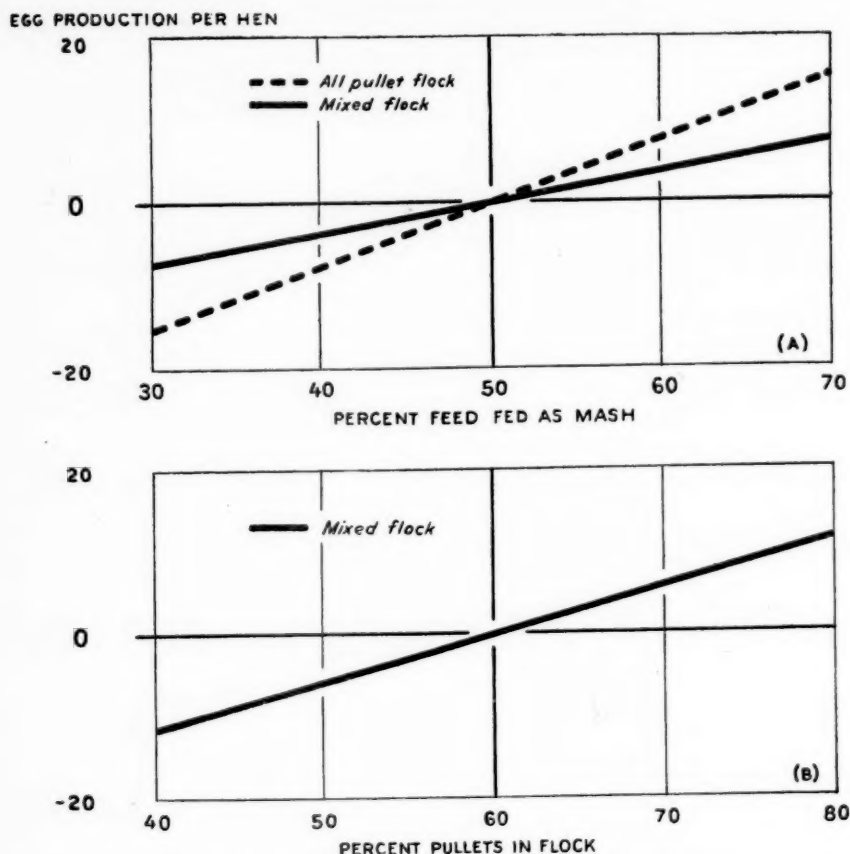


FIGURE 2.—Net Relation (A) between Per Cent Feed Fed as Mash and Egg Production per Hen, and (B) between Per Cent Pullets in Flock and Egg Production per Hen

mash, the solid line in Section A indicates that 5.5 eggs should be added to the estimate read from Figure 1. Or if the flock were only a 40 per cent pullet flock, the solid line in Section B indicates that 11.5 eggs should be subtracted.

Taken together, Figure 1 and Sections A and B of Figure 2 can be used to estimate egg production per pullet or per hen, provided there is no severe outbreak of disease. They also provide a direct comparison of the performance of the two types of flock with reference to variation in the quantity of feed and proportion of feed fed as a mash. On the average, the pullet and old hen or mixed flocks were somewhat more responsive than were the pullet flocks to changes in the total quantity of feed fed. The pullet

flocks, in turn, were approximately twice as responsive as the mixed flocks to changes in the proportion of mash fed.⁶

Some question may be raised as to the statistical significance of the results which have been presented. The standard error of estimate of the pullet-flock correlation was 13.88 eggs per pullet. This may be interpreted to mean that two-thirds of the estimates made from the regression equation relationships should normally fall within 14 eggs of the actually recorded or produced number. The standard error of estimate of the mixed flock correlation was 14.50 eggs per hen.

The coefficient of determination (the square of the correlation coefficient) is sometimes used as a measure of the degree to which the variance in the dependent factor is explained by a correlation. For the pullet-flock correlation, the coefficient of determination is 0.372. For the mixed-flock correlation, it is 0.550. These are to be interpreted to mean that 37 per cent of the variance in the egg production data is explained in the pullet flock correlation, and 55 per cent of the variance in the egg production data is explained in the mixed-flock correlation.⁷

Since only 37 and 55 per cent of the variance in the egg production factor were explained in the two correlations which have been presented, some question may be raised as to the unexplained portions? Although an explanation of the difference, or of the agreement, between the reported and the estimated production for each flock would have been desirable, the available data were not complete enough to allow such a step. Instead, only a general discussion of the subject can be presented.

The unexplained portion of the variance is due to a large number of unmeasured and unconsidered factors which affect egg production. As already indicated, the inherent productive

⁶ Since October, November, and December feed consumption data were available on some of the records for the 1930-31 production year, an attempt was made to further investigate the difference in the response to the percentage mash factor. The flocks were grouped with reference to the percentage of pullets included in the flock and the average relationship between the pounds of mash fed per hen and eggs produced per hen in the fall quarter was determined for each group. For flocks in the all-pullet group, a 2-pound change in the quantity of mash fed per pullet resulted in a corresponding average increase or decrease of 4.25 eggs per pullet. For flocks in the 0 to 49 per cent pullet group, there was no apparent relation.

⁷ It is of some interest to know what part of the 37 per cent or 55 per cent is due to each of the several factors included. If the "P_m" value for each case included in the mixed-flock correlation is multiplied by the regression coefficient obtained for that factor and the resultant sum subtracted from the "E_m" or egg production factor, the effect of the "P_m" factor will be eliminated. The corrected egg production data may be correlated with the quantity of feed fed and the percentage of the feed fed as mash to obtain a corrected coefficient of correlation of 0.680. When squared, this gives a coefficient of determination or a percentage explanation of 46 per cent. The percentage pullet factor in the mixed flock correlation was responsible for an explanation of 9 per cent. The 37 per cent pullet-flock measure of determination and the 46 per cent mixed-flock measure are directly comparable. These two comparable measures may be broken down by squaring the simple correlations since the intercorrelations between the independent factors are all extremely small. The pullet flock determination is made up of 22 per cent determination due to the feed factor and 15 per cent determination due to the percentage mash factor, and the mixed flock determination is made up of 42 per cent determination due to the feed factor and 4 per cent determination due to the percentage mash factor.

capacities and efficiencies of the pullets and hens included in the flocks studied were believed to be approximately equal. The young chicks were all of the same breed, and they came from hatcheries which were generally believed to handle the same strain of the breed. And since flock averages were used in the correlation work, such variation in inherent capacities and efficiencies as was present should have averaged out. Were the mixed flock correlation adjusted for average differences between the three years which were covered by the data, the coefficient of determination would be raised somewhat. Variation in both the number of hours per day and the number of days per year that lights were used in the laying houses might be a factor of some importance. Any element of error in the data would usually contribute to the unexplained variation in egg production. And in addition to any variation in the practices affected by the management factor or any element of error, there are many things which may accidentally affect egg production. As long, however, as there is no significant correlation between any important unconsidered factor and some considered independent factor, both the regression equation and the coefficient of correlation can be correctly determined.

The acceptance or rejection of such analyses as those which have just been presented is dependent upon the question as to whether the results from such analyses can or cannot be applied in the case of any one individual or flock.

We may, at one extreme, conceive of each hen or each flock as a unique individual which will react to changes in the quantity and the composition of the feed fed in a unique manner. Or, at the other extreme, we may conceive of the entire hen population as composed of similar individuals so that an accurate description of the feed-production relationship for any one individual or flock would hold for any other individual or flock.

If the first concept were the true concept, no standard or general relationship could be determined between the variation in the quantity of feed fed and variation in the output. Each animal would require individual attention.

If the second concept were the correct concept, two approaches to the determination of a general relationship would be possible. Either a single animal could be fed varying quantities of feed and the variation in output or production observed or the type of study which is presented in this report could be made. Either approach would apparently give the correct result. But an additional fact must be noted. Production is not altogether deter-

mined by the quantity of feed fed in any given period. It also is affected by the quantity of feed fed in the period just preceding the period through which production might be measured, by the age of the animal in question, by the composition of the feed fed, and by the health of the animal in question. Since several different rates of feeding could not be experimented with on the same animal at the same time, the statistical method would clearly have an advantage over the observation of any given animal. But the number of animals needed would only have to equal the number of different kinds or amounts of feed with which it was desired to experiment.

From observation we know that our second concept is not exactly correct. If we conceive of production as the result of (1) an animal's capacity to consume feed, and (2) an animal's efficiency in converting each unit of feed into production, we know that different animals differ in respect to both their capacity and their efficiency in the use of feed. From observation we also know that our first concept is incorrect. Certain classes of animals tend to respond to changes in the kinds and amount of feed offered them in approximately the same manner.

As a result, we find that the usual feeding experiment is conducted with two different lots of animals of approximately the same age, the same weight, the same physical condition, and the same breed. In short, the fact is recognized that the statistical approach to the problem is the correct approach.

But the fact is recognized to only a limited extent. The usual feeding experiment is conducted by the "experimental method." A small number of animals of approximately the same type are divided into a small number of lots and the results which are obtained are expressed in terms of averages for each lot. And from the experiments with small numbers conclusions are drawn and generalized to the entire general group or class from which the animals were originally drawn.

Although it is admitted that the more numbers an average is based on the more reliable is the average, a real statistical approach to the problem of determining feed-production relationships is not often used by animal or poultry husbandmen. In fact, a usual objection to a study such as the one just presented, and a real one, is that the individuals included in the study are so widely different from the standpoint of environments, capacities, and efficiencies that no reliable conclusions can be drawn. It is usually assumed that a controlled experiment can be conducted with a small number of the highly individual

animals and conclusions reached which will apply to the whole variegated mass which the statistician would like to see studied. Why the difference?

The answer is generally held to be in the "control" feature. It is argued that there are innumerable factors which ordinarily affect production, and if an attempt is made to study the feed-production or any other biologic-economic relationship in any but a closely controlled environment that the results of the study will be affected by so many unobserved or unmeasured factors as to invalidate them. But how can the results of an experimental study be applied in actual practice if the argument is correct?

If the introduction of a variable management factor and a relatively uncontrolled physical environment make impossible the correct measurement of the factors affecting animal production, they also make the practical application of an experimental result questionable. The experimental method is valuable in that it makes possible the better explanation of the biologic processes involved and indicates what may be achieved with proper control. But the farmer, or the farm management worker, is also interested in what can be achieved by the typical farmer. If properly selected and analyzed,⁸ data obtained from an actual farm environment should apparently give as useable a feed-production relationship as data obtained from a closely controlled experiment.

Since the results which have been presented are admittedly suggestive rather than final, some consideration may be given to the problem of how they might be improved, or how an accurate study might be conducted.

Even though all the desired data cannot be obtained by the survey method, such a method might well be used to obtain the material for a first study. The survey should be a joint farm management and poultry husbandry project. Care should be taken to obtain accurate data on the kinds and quantities of feed fed, on the number of pullets and hens in the laying flock, on the disease record of the flock, and on egg production. Where possible, pullet and old hen data should be separated. Several chemical analyses of representative mash and grain feeds might be obtained. And, finally, such information as possible should be obtained about the non-measurable methods of feeding and management used in the case of each flock. Although the data de-

⁸ The farm data should be selected and analyzed with reference to (1) the actual degree of control which the farmer may be expected to exercise, (2) the extent to which accurate measurement is possible, and (3) the extent to which segregation, as by breed or type of farm, is possible.

rived from such a survey would not yield all the information desired, they should be complete and accurate enough to yield a first approximation of many of the relationships involved and to provide a general background for a more specialized project.

To obtain the more detailed information, either a series of experiments might be carried out at an experiment station or some arrangement might be made to obtain supervised records from individual poultrymen. Again, the project should be carried on as a joint farm management and poultry husbandry project. Were the experimental method adopted enough pens or lots should be used to make the results statistically significant and, equally important, commercial producing practices should be used. If supervised records were to be used, some of the poultrymen might well be paid for their cooperation since some of them might have to operate at an unprofitable level to provide some of the needed data. In fact, all the cooperating poultrymen might well be paid a small sum as compensation for such added efforts as the record keeping might involve.

To insure the collection of the proper data and to reduce the cost of the project, the analysis of the data should be carried on concurrently with the collection. In analyzing the data an effort should be made to determine and to distinguish between such relationships as were (1) applicable to each individual pen or flock, and as were (2) derived from the association between the several capacities and productions of the several flocks studied. The first type of relationship should be valuable as a direct guide to production management, and the second type should help indicate the type of pullet or hen which the poultry husbandmen should work toward, or the type of flock which the poultrymen should select.

Some of the data which might be obtained would be feed and egg production data for pullets raised under varying methods of management, feed and egg production data for pens rather than flocks, especially for pullets segregated by poultrymen according to apparent maturity and probable rate of production, and for pens or flocks fed widely varying kinds and quantities of feed, data on ages, on the use of lights, on disease and death losses, and on culling, and such financial cost data as might be wanted. And, again, such information as possible should be obtained about the non-measurable methods of feeding and management used in the case of each flock.

Such data, properly analyzed, should indicate whether the feed production curve is a diminishing returns curve or a straight

line up to a point of maximum production from which a sharp downward drop is recorded, and whether the quantity of mash fed and the quantity of grain fed exert a joint influence on egg production. The apparently greater response of pullets than hens to the percentage of mash fed could be determined more accurately and the importance of the age of the pullets at the start of the laying season could be studied. And, finally, the feed-production relationship could be analyzed and stated separately for pullets and hens in terms of kinds and quantities of feed fed and number of eggs produced each month throughout the year. Such a statement of the feed-production relationships, together with an analysis of the period of time required for a pen or a flock to respond to a change in the feed ration and an analysis of the relation between the rate of production at the start of the laying season and total production for the year, should be of real value to individual poultrymen.

USE OF THE TYPE-OF-FARMING MATERIAL OF THE 1930 CENSUS IN RESEARCH AND TEACHING¹

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A well rounded research program in Agricultural Economics covers a wide range of subject matter. Each field of inquiry is concerned primarily with a particular segment of the larger whole and necessarily requires data of a rather specific nature. From this it follows that general statistics collected by official governmental agencies, having no particular objective in view other than that of showing the "state of the union" are likely to have rather serious limitations for specific studies and usually will need to be supplemented by other data. Although this, in general, is true these data when thrown into various sorts and tables can be made to bring out a great many significant relationships which will be particularly germane to specific lines of inquiry. It is from this latter standpoint that the type-of-farming tabulations of the 1930 Census most readily lend themselves to research use.

These tabulations, as is well known, are a new feature of the Agricultural Census. They probably do not represent as finished a piece of work, consequently as would have resulted with more experience as a background. The classification on a whole, however, seems to have worked out fairly well, with the result that a much more detailed picture of our agriculture is now presented than has heretofore been available. Probably herein lies their greatest value. The background information they supply will be particularly helpful to students and others in acquiring a more intimate knowledge of our agricultural resources and the way they are administered by different producing groups.

Before taking up the use of these data in specific lines of research it is desirable at the outset to indicate briefly just what they include and at the same time call attention to the possibilities they offer for additional sorts and tabulations. This will enable the reader to follow more closely the subsequent discussion.

These tabulations cover a rather wide range of subject matter. The more important of the basic statistics on agriculture have been classified by type of farm. Among them are included, in the first place, a count of all the farms in the United States by type. They also include the basic information on each of these

¹ This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 30, 1932.

types of farms such as land in farms, land in harvested crops, plowable and other pasture, value of property, value of products, number of the important classes of livestock, production and sale of selected livestock products (by two types of farms only), expenditures for feed, labor and fertilizer and finally, numerous counts of each type of farm classified by size of farm, by value of products, by tenure and race of farm operator. In addition to these published tabulations are included others which are as yet unpublished; among which is a tabulation of value of products by color and tenure of farm operator and counts of farms by value of products classified by size of farm and by subtypes of abnormal farms. All of these tabulations are presented by counties, states, and geographic divisions as well as for the entire country.

The tabulations which have been made, of course, fall far short of exhausting the possibilities of the data. Inasmuch as the type code has been punched on most of the important cards the possibilities for additional sorts are almost infinite.

Little has been done, for example, in the way of township tabulations other than a rough count of farms by type for some twenty or twenty-five of the states. Although tabulations for such small units are expensive, numerous sorts could be made, on a sample basis, which would be of a great deal of value in various lines of research and at a cost which would not be prohibitive. Likewise nothing has been done on mortgage debt and taxes, on farm facilities, age of operator, or on the acreage and production of individual crops by type of farm. This latter tabulation is needed particularly to round out the information on the organization phase of the farm business.

Furthermore, tabulations showing variations in crop and livestock combinations on particular types of farms or variations in income from these different combinations, and many others of like nature have not been made. Any one or all of these would throw much needed light upon farm organization and operation problems.

Turning now to the specific research uses to which these data are applicable, it is apparent from their nature that they will find their greatest use in farm management and land utilization studies. Practically all the tabulations which have been made apply more particularly to these lines of inquiry than to any other. This does not mean, of course, that these are the only uses of the data. They in fact supply a great deal of information for numerous other studies as we shall see presently.

In land utilization studies having to do with the determination of the major uses of land, the type-of-farming material will be of value principally in supplying background material showing the conditions prevailing in particular areas. The income data will aid in distinguishing the better from the poorer agricultural areas. If access is had to the individual schedules, the crop and livestock combinations, yields and returns on particular farms can be directly related to the physical conditions prevailing in particular areas or regions thereby providing, in conjunction with other data, a basis for classifying agricultural land into various grades according to its adaptation for particular uses.

The greatest use of the data however will come in strictly farm management studies which are concerned primarily with the determination of the competition between the uses of land and other resources for agricultural purposes only. From this standpoint this type-of-farming material will be used principally in three types of studies: (1) the differentiating and mapping of type-of-farming areas; (2) the segregating and measuring of the physical and economic factors associated with or determining particular types of farming, and (3) testing out and determining the best combination of enterprises for particular areas or regions under prevailing or prospective economic conditions.

In all of these studies it will be found that the published material will need to be supplemented by more detailed information from the schedules. This will involve the working out of some sort of cooperative agreement with the Bureau of the Census whereby access to the schedules and use of the unpublished information can be obtained.

Taking up now a more detailed discussion of each of these lines of inquiry we shall begin by considering the most obvious and at the same time probably the most important use to which this material will be put. This has to do with the differentiating and mapping of type-of-farming areas.

The determination of type-of-farming areas is logically the first step in farm management research. One of the first problems which the research man has to face is that of selecting the area of study and of defining its limits. He should, and does attempt to free it, in so far as possible, of unrelated and extraneous factors, thus narrowing the field of study to its essential and related elements. The differentiation of a state or region into type-of-farming areas within which there is a reasonably high degree of uniformity in enterprise combinations, practices and conditions

of production obviously is an important step in this direction.

The type-of-farming areas not only provide the research man a basis for defining his universe and hence for sampling, but they are of a great deal of value in other ways. Many of our basic agricultural data, for example, would be of more significance if they related to type-of-farming areas instead of to political units, such as townships, counties or combinations of the same. Similarly, studies made with the view of obtaining methods and practices from which general standards are to be derived will be more representative if confined to type-of-farming areas. The same is true of elasticity of supply, farm income and many other studies.

The type of analysis which lends itself most readily to the differentiation of type-of-farming areas is that of qualitative description and visual correlation. Inasmuch as the subject is by nature geographic, reliance has to be placed, to a considerable extent, upon graphic presentation by means of dot and hachure maps, bar charts, etc. Due in part to the nature of the problem and in part to the character of the data available these studies in the past have followed a rather conventional line of attack. The new and more complete data from the 1930 census provide a different basis of approach and also permit, as we shall see, a more precise and trustworthy classification.

The principal short-comings of type-of-farming studies as made in the past, have related to the lack of a suitable measure of type and the inability to measure adequately the dispersion in type within a given agricultural region or type-of-farming area. Both of these difficulties arose, largely because of the character of the data available for such studies. County census figures were usually the only data available and the relative significance of enterprises, based on area or numbers, was very difficult if not impossible to determine.

To assume that counties have the same type of farming because they show a high degree of similarity in their enterprise combinations based upon coefficients derived from unclassified county group totals may be very misleading. Significant variations within counties may be, and frequently are, completely smoothed out in the totalling process. In states having a high degree of uniformity in their physical conditions, the method works out fairly satisfactorily, but in New England and regions of like nature it is impossible to get much precision in the classification when this approach is used.

Both of these difficulties are largely overcome by the new data from the Census. In the first place, these data provide a satisfactory measure of type, which has not been available heretofore. This measure is income—probably the best available for the purpose. Income provides a common denominator to which the relative importance of different enterprises can be reduced. It is subject, however, to fluctuations from year-to-year and also, like area (although not nearly to the same extent), must be used with caution in determining the relative significance of enterprises with varying degrees of intensity.

This 1930 census classification not only identifies the type of farm, but also provides a basis for attaining much greater precision in mapping type of farming areas. Whereas, the mapping of such areas heretofore has been based largely upon similarity in crop and livestock enterprises determined from county totals, now they can be determined directly by a building up process from the individual farm. Areas or regions can be delimited on the basis of the proportion of the total farms which are of a given type, thereby enabling the investigator virtually to control the dispersion which will be permitted in a particular area. The number of areas which will be differentiated under this method of approach, obviously, will be determined by the amount of precision desired by the investigator.

Having each farm classified by type, furthermore, provides a basis for studying the variation within a given type by going back to the individual schedules or cards and working out frequency distributions and complete crop and livestock organizations found upon representative farms. As is well known wide differences exist between farms of the same type. Wheat farms, for example, will be found in the same area which will have from 25 up to 100 per cent of their farm area in wheat. The same is true of cotton farms, potato farms as well as other types. That farms varying so widely in organization would be affected differently by a given economic situation seems obvious, yet this fact has been lost sight of in recent years by some of the important agencies advising the farmer.

Closely allied with the differentiating and mapping of type-of-farming areas is the related problem of accounting for these areas and the types of farming in them. This may be looked at from two points of view—one to show what physical and economic factors are at present associated with them, and which presumably determine where they are and why they are, and the

other to explain their present form and location by showing from what they have evolved and what factors have operated to induce the change.

The census material by type will be of little use from the latter standpoint, inasmuch as it applies only to the one year. The possible association between a present set-up and a past condition, however, should not be lost sight of in an analysis of this kind. This is particularly true when attempting to determine causal relationships quantitatively and to assign relative effects to independent factors.

This material can be used advantageously in studying this problem when approached from the viewpoint of segregating factors associated with or showing a co-variance with given types of farming or type-of-farming areas. The most common procedure in studying this problem has been by the method of visual correlation. This has taken the form of constructing maps and charts of various physical and economic factors supposed to determine the localization of types of farming and then superimposing them over type-of-farming maps and observing the apparent coincidence between them.

Frequently this method of analysis will disclose relationships which are significant, particularly, when considered in conjunction with a qualitative analysis of the internal relationships involved. A case in point is the localization of certain fruit areas in the United States, also of range livestock production and of self-sufficing and part-time farming areas. It is easy to be led astray, however, in placing too much reliance upon apparent relationships such as will be disclosed by this method of analysis.

This leads up to the question of how much reliance can be placed in determining associations and relationships between types of farming and so-called causal factors in more formal correlation analysis when using these data. This method was used in a limited way, and I believe effectively, in determining errors in coding and in checking the validity of the results in the final critical examination of the census tabulations by type of farm. Using the count of farms by counties for a particular type as the dependent variable, various independent factors were correlated with it to determine if the farms for the various counties had been properly coded and if the results were consistent. The scatter about the regression line frequently would reveal upon examination that the farm had been incorrectly coded.

Geographic data, however, do not lend themselves as readily

to this method of analysis as do historical data, ordered in time. It is difficult to determine if a current practice, although highly correlated with a particular factor is due to that factor or whether it is due to some other factor with which it is highly inter-correlated. Furthermore, there are hold-over or accrual effects of past factors upon current practices which are very difficult to separate and measure. No satisfactory method has as yet been devised for measuring geographic trend and until such a measure is developed one cannot be sure of the net effects of specific factors in studies of this kind.

If such studies are based on a thoroughgoing qualitative analysis of the internal relationships involved, they will be helpful in revealing relationships and for checking conclusions arrived at by other forms of analysis. They, however, cannot always be taken at face value or trusted implicitly. There is so much lag and inertia in agricultural adjustments and the data for the most part are so inadequate, that they will always have to be interpreted with caution.

This accounting for types of farming in particular areas is probably the most important phase of types-of-farming studies. It involves more than the mere showing of high correlation coefficients between certain quantitative factors and the prevailing types of farming. The internal relationship of the farm business with respect to supplementary and competing enterprises, are oftentimes just as important, or more in determining the type of farming as are the physical factors. Such an analysis in any event should always precede formal correlative analysis and also serve as a strict check upon its findings.

If the analysis of the factors determining types of farming is carried through in a thorough way the problem of the determining the farming systems best adapted to a particular area or region is thereby considerably simplified. This latter problem however at best is a very difficult problem. Obviously a great deal more information is needed in its solution than is supplied by these types of farming tabulations.

The chief value of the type-of-farming material will come in the background information it supplies and in the detailed picture it furnishes of the farming systems in particular areas. This detail is indispensable to a proper understanding of the problem and the way in which given economic conditions will affect the different producers.

The problem of determining the farming systems most advantageous for an area have to do, on the one hand, with the con-

ditions within the area—of the physical adaptability of crops; of the prevailing crop and livestock combinations; of alternative crop and livestock enterprises which may be substituted, in part or wholly for them; of the supplementary, complementary, or competing relationships of these enterprises; of crop yields; of practices and the like. On the other hand are involved all of the external factors affecting prices and costs such as production in competing areas, whether domestic or foreign, changes in demand, changes in consumption, changes in technique and new machines.

Probably the approach most often used in this problem at the present time is that of the method of substitution or budgeting. The essential features of the method is to estimate the probable returns which can be expected at present or prospective prices from a given set of resources on a given size of farm with a particular combination of enterprises. These returns then are compared with those calculated in a similar way for other combinations of enterprises on similar sizes of farms and thereby the investigator eventually arrives at the one which he considers will prove most profitable.

In this method of approach the type-of-farming material of the Census can be used to indicate the prevailing crop and livestock combinations on farms of different sizes in any area thus providing a direct basis for budget making. Inasmuch as considerable labor is involved in the calculations the usual procedure is to limit such budget estimates for the typical or most common crop and livestock combinations on the more common sizes of farms.

Obviously if a thorough analysis is made it will be necessary to go much beyond the typical farming systems for the dominant sizes of farms. Budgets would have to be worked out for the extremes as well as for the mode and for combinations in between.

This method has the advantage of simplicity and further provides the proper approach to the problem, i.e. from the standpoint of alternative opportunity. It permits an analysis of the effect of changes in practice or changes in combination upon the entire farm business. Various alternatives can be tested out and the probable effect they would have upon returns can be determined.

The problem of determining comparative advantage within an area, however is not quite so simple a problem as this discussion may indicate. In fact it is doubtful if the exact compara-

tive advantage can be determined by this or any other method that has yet been devised. It can be determined within reasonable limits to be sure, but there are so many variables and unknowns in the problems, and the data are so poor that it is probably impossible to do more.

Then too, the question of what difference in returns between organizations should be considered significant is difficult to determine. There has been a distinct tendency among certain investigators to consider differences of \$100 or more as significant. It is decidedly questionable if such small differences are really of any consequence. The errors in estimate arising from the standard conversion factors used may more than account for such minor differences.

There furthermore has been a tendency to generalize from budget analysis without adequate qualification of the effect the general shifts shown by the analysis would have upon the prices of the adjusted products. This emphasizes the conflict between the individual and the national point of view. What would be advantageous for the farmers in a small restricted area may be decidedly disadvantageous if carried out by the entire group.

This also emphasizes the importance of looking at our agricultural problems from the regional or national point of view and planning more of our research on a regional basis. A great many of our research problems are of this character. By pooling resources the various states could carry through much more comprehensive studies than would be possible for most institutions to undertake alone.

The census material by type will provide a basis for mapping and differentiating such regions. A study is now nearing completion in which the entire United States has been differentiated into agricultural regions and type-of-farming areas in this way. The results of this or similar studies could be used directly in locating and planning regional studies of the character mentioned.

In addition to these major uses of the type-of-farming material in farm management and land utilization studies there is a further application in special studies of various kinds. Among these may be included farm income, farm tenure, farm mortgage debt and tax studies; also family living and part-time farming studies.

Considerable material is available for the latter study, particularly. Part-time farming has increased rapidly in the United States in recent years. The census classification showed 339,207 such farmers in the United States in 1929. If the classification had been made slightly less rigid this number no doubt would

have been much larger. There are two distinct kinds of part-time farms. One group represents mainly industrially employed people living on small farms adjacent to the city. The other group is located in rural districts usually in proximity to timbered, mining, or oil regions.

In addition to these groups there is another kind of farmer, not working off the farm for a sufficient period to be called a part-time farmer yet supplementing his farm income by working at odd times on highways, at saw mills etc. or occasionally in factories in more distant cities during the winter or in seasons when work on the farm is slack. Each of these groups is of increasing significance and merits additional study.

Then finally there remains to be mentioned the use of this material in teaching. Probably its greatest value from this standpoint will come from the detailed picture it gives of our agricultural resources and the opportunity afforded the student for ascertaining a detailed knowledge of their geographic distribution. The material furthermore supplies a great reservoir of information for problems of various kinds, and material for illustrating the laws of specialization. The material is particularly applicable to the teaching and illustrating of the principles of comparative advantage, regional competition and of von Thünen's principle as well as of other relationships in production economics.

DISCUSSION BY W. E. GRIMES

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The type-of-farming materials of the 1930 Census are an outstanding contribution to the information available concerning the agriculture of the United States. Their uses in research and teaching undoubtedly will far exceed any enumeration that might be made at this time. Their value may be expected to increase as investigators and instructors learn more of their possible uses and as further analysis reveals their possibilities. Also, as similar additional information is secured with each succeeding enumeration, as it is assumed will occur, the value will be enhanced. It seems probable that these data will come to be looked upon as by far the most important part of the agricultural information in the census.

Dr. Elliott, in his excellent paper, has dealt chiefly with the use of the data in farm management research. The data will find their greatest use in this field but this does not detract from their value in other phases of the field of agricultural economics. Time limitations prevented Dr. Elliott from enlarging upon his suggestions for their use in other fields. Since it would be presumptuous to criticize a paper that was chiefly descriptive and which was written by the one best qualified to do this, probably the better contribution to be made in this discussion is to suggest some of the other uses that may be made of these data.

Within the field of marketing these data should prove of material value. During the last decade or so many attempts have been made to increase the number of cooperative marketing associations. Many of these attempts have succeeded while many others have failed. It seems probable that in the future the percentage of successful attempts could be increased materially if the type-of-farming data of the census were used to determine the need for such developments. For example, it was recently suggested that a cooperative livestock shipping association be started in a mid-western community. A successful organization of this type was functioning in an adjoining county. This adjoining county had about the same number of farms as the county in which the new organization was proposed. Also the average size of farm and the total number of livestock for the two counties were almost identical. On the basis of the kind of information available from preceding censuses, the conditions in the two counties appeared to be quite similar.

The type-of-farming data in the 1930 census told an entirely different story. The county with the livestock shipping association had a large percentage of general farms each of which produced livestock to market in less than car lots. The second county had many large farms that produced livestock to market in car lots. The average size of farm in this county was reduced by a high proportion of small farms that produced few meat animals. Also, local information indicated that the leading farmers in this county were on the larger farms and consequently would not be interested in the proposed shipping association. It was just another instance of deception by averages. Needless to say, the movement to organize the shipping association was not pushed and much time and effort were saved.

Correlation of type-of-farming materials with the time of marketing various staple farm products might reveal much interesting and useful information. For example, do farms of certain types tend to market their products at harvest while farms of other types tend to send their products to market in a more orderly manner? Such a study, of course, would require the securing of information on the market movement of crops from various type-of-farming areas and the correlation of this information with the type-of-farming data. It is to be expected that the type-of-farming materials will be used to a material extent to supplement data secured in other studies.

One is intrigued by the possibilities of these data as revealing more concerning the causes of tax delinquency and the relative pressure of the tax burden in various type-of-farming areas. The same thing applies to delinquency on mortgage debts. It would seem that much useful information could be secured by further analyses of the data along these lines.

These are but a few of the many possible uses which might be suggested for these data. Their analysis by the Bureau of the Census has been terminated. Dr. Elliott's forthcoming monograph unquestionably will add much useful information but as he indicated in his paper, the analysis of the data is far from complete. It is to be hoped that ways will be found or made available to continue this analysis and open up further this mine of useful data to the agricultural interests of the United States.

THE THEORY OF COMBINATION OF ENTERPRISES ON INDIVIDUAL FARMS¹

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The writer desires first of all to confess that unfortunately no new revelations on the theory of combination of enterprises have come to him in the preparation of this paper. Merely to review the contributions of other workers in this field may seem like threshing over old straw. This is especially true since the theories bearing on this subject have been admirably stated by a number of writers in recent farm management literature.²

However, a review of the farm management research work to date, especially as it relates to the problem of combining enterprises on individual farms, leads to the conclusion that there are some phases which need to be given greater emphasis in the future if the results are to show real progress in the field. First of all we need to close the gap between the broad economic principles, which form the foundation for our approach to the farm management problem, and to the analysis of specific problems on individual farms. In other words, we should try to place the problem of the combination of enterprises on the individual farm in its proper setting with respect to the general economic principles which have a bearing on that problem. This may mean a preliminary qualitative analysis and later a refinement, testing, or application of such principles; or all of these steps in some instances, but the important point is that the analysis is not complete before the nature of the connection of the principles to the specific problem is decided.³

Secondly, we need closer analysis of the situation on actual individual farms if our conclusions are to have as much validity as we would like to claim for them. This involves more detailed information on the nature of each individual enterprise in the business; but also, and more important perhaps, a greater realization of the complexity and the essential unity of the organism called a farm business.

In the third place we need to coordinate our work in farm management with other agricultural research work especially that of agronomy, animal husbandry and engineering. The writer is

¹ This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 30, 1932.

² See especially chapters on this subject in *Outlines of Agricultural Economics*, by H. C. Taylor; *Production Economics*, by J. D. Black; *Economics of Farm Organization and Management*, by C. L. Holmes; also *Research in Farm Management*, Social Science Research Council Bulletin No. 13; as well as numerous Department of Agriculture and state agricultural experiment station bulletins; and a large number of papers in the *JOURNAL OF FARM ECONOMICS*.

³ Social Science Research Council Bulletin 13, *Research in Farm Management*, page 14.

aware that this is more easily said than done. Even in institutions where the friendliest relationship exists it is often difficult to work out a program of cooperation because the long time programs of research work which are in progress do not happen to coincide.

Lastly, the events of the last two years have taught us the extremely dynamic nature of the farm organization problem, a part of which concerns itself with the combination of farm enterprises. Static, cross section analysis therefore has only very limited application to the individual farm unless it is possible to reinterpret the conclusions in the light of rapidly changing events.

Our logical approach to the question of combination of enterprises on the individual farm is an analysis of the broad economic principles which have a bearing on the problem. Such an approach constitutes the basic qualitative analysis which should precede the field work on a particular study. When the time comes for analyzing the specific data gathered the questions of refinement, testing and application of these principles will arise.

Foremost among the principles to be considered for our particular problem is the principle of comparative advantage and its corollary the law of first choice of areas. These furnish the basic setting for the choice of enterprises on individual farms in any area. It should be recalled that a proper statement of these principles includes the natural advantages as well as the demand and price conditions and other economic factors which influence the production advantage of an area for any one enterprise or combination of enterprises.

The main factors which constitute the basis or the nature of the advantage in production in any area may be classified as follows:

1. Physical factors—including climate, soil, surface and water supply.
2. Biological factors—such as freedom from weeds, insect pests and plant diseases, presence of certain soil bacteria, etc.
3. Social factors—as for instance, density of population, nationality groupings, local labor supply, etc.
4. Historical factors—among them, an established farm plant, and a reputation as a source of supply for certain products which has been built up over a period of years.
5. Political factors—including tariff protection and propaganda for the growing of a certain crop such as sugar beets.

6. Economic factors—such as available markets, transportation facilities, available capital, etc.

While it is important to determine the position of an area with respect to the above factors, it is equally important to analyze the price factors and the price trends for each of the commodities produced in the area. Price changes, which reflect shifts in relative demand for different products, or changes in the general price level with their accompanying maladjustments, may alter considerably the production advantage of an enterprise, or combination of enterprises. The relative demand for different products and the resulting price structure must therefore be given an important place in determining the comparative advantage of an area in the production of any product or combination of products.

The area to be studied may have an advantage or a disadvantage in any of the above named factors in its production of a product or combination of products. The advantages may be inherent in the area or be dependent upon purely temporary conditions. It is of considerable importance in any study to determine the probable permanency of the different advantages. The physical and biological factors perhaps set the outer limits in the choice of enterprises for the area. Within these limits a good many combinations of enterprises are possible. The most effective combination on the individual farm will depend upon the other bases for advantage in production which have been listed above, as well as upon internal differences between farms, and upon the price relationships which are likely to prevail.

While usually considered separately, the supplementary, complementary and conflicting relationships between enterprises are factors in determining the comparative advantage of any one enterprise and the advantage of a certain production combination in an area. The profitableness of one enterprise as compared with another may depend to a considerable extent on its relationships to other enterprises in the combination. Because of the operation of the law of first choice the main enterprise is fairly well fixed for large areas, and other enterprises will be built around the main enterprise to the extent that they supplement, complement, or do not very seriously conflict with the first choice enterprise. In other places, such as the grazing and dry land wheat areas of the Great Plains, the possible alternatives to the main enterprise are so limited that the supplementary, complementary and conflicting relationships of other enterprises scarcely enter into the picture. The question of relationships be-

tween enterprises as a part of the problem of choice becomes much more important in the areas which we might call *zones of division* between the rather well defined agricultural regions, such as the corn belt, the cotton belt, etc.

Analyses of the bases for comparative advantage, and studies of the physical and price relationships between enterprises, furnish the general setting for determining the combination of enterprises which gives the highest return for the resources used in production, and which therefore has the greatest economic advantage in the area. What we are next interested in is a means of measuring the comparative advantage of different combinations of enterprises. In order to do that we must have a means of determining, in value terms, the effects of the different bases of advantage, and the physical and price relationships, on the returns from different enterprise combinations. What we are seeking is the "highest profit combination" of enterprises.

The "highest profit combination" has usually been discussed from the standpoint of proportioning the factors in the production of a single product.⁴ What is wanted in the analysis of the problem of combining enterprises is the "highest profit combination" from the use of the factors in the production of a combination of products. Fortunately the same tools can be used for the analysis of both problems. Marshall in his discussion of the principle of substitution has indicated the most fruitful approach. He has outlined a problem similar to our own in his familiar illustration of the "speculative builder" who is trying to decide what to build, and what materials to use, and in what proportions to use them.⁵

The principle of substitution then, is our tool for measuring the comparative advantage of different combinations of enterprises. The enterprise combinations are to be compared on the basis of estimated net returns for the resources used. The combination of enterprises which we are seeking is the one which will give the highest possible economic advantage to the farm entrepreneur for the use of the resources under his control.

The question might well be raised here as to the time period involved. The farmer starting in business will make his investment in land and capital resources in such a way that he is equipped to produce the combination of enterprises which is likely to yield him the highest net return for his efforts and his investment over a fairly long period. This period may correspond

⁴ See *Production Economics*, by J. D. Black, Chapters XI and XII.

⁵ *Principles of Economics*, eighth edition, page 358.

to the life of his long term capital investments, or if he is purchasing land, he may consider his rewards for a life time spent on this particular farm. Once the farmer's commitments in land and capital resources are made however, they can be considered as "fixed resources" for the time being. Very often it is not possible to obtain more land close enough to the home unit for economical operation. Because of difficulty in obtaining working capital, even livestock and machinery are "fixed resources" at the present time. Even greater difficulty may be encountered in attempting to contract the size of the business once it has been expanded. Thus from a "middle term" point of view, the problem becomes one of combining enterprises in such a way that the greatest economic advantage accrues to farm entrepreneurship for the use of resources which for the time being are relatively fixed.

It is recognized that from a "long term" standpoint the amount and proportion of the resources other than entrepreneurship can be changed. Theoretically, such changes will take place until the kind and size of business is adjusted to the capacity and efficiency of the farmer entrepreneur. Practically, the opportunities for changing the amount and proportions of the resources which are fixed for the time being will vary according to the life of the resource considered and the farmer's means of replacing it in various proportions.

Even though some of the resources used by the farmer are fixed in amount for the time being there is some flexibility in their use. For instance, a farm may have a barn which was formerly used for horses. Perhaps with not a great deal of additional investment it may be used for beef cattle, sheep or even dairy cattle. Likewise the same tillage machinery can be used on different crops. Thus a part of the problem of combining enterprises involves the decision of how the fixed resources shall be used, as well as the kind and amount of variable factors to include in the combination.

In the individual case the capacity and efficiency of each of the factors to be used will affect the combination of enterprises which is likely to result in the "highest profit combination." For instance, a herd of high producing cows in the hands of an operator who is a skilled dairyman would undoubtedly make it advisable to maintain dairying as an important enterprise even in an area where dairying is ordinarily only a sideline. A good many of our rather extreme variations from the most common types of farming in an area can be explained in this way.

In order to arrive at decisions of more general applicability as to the most remunerative combination of enterprises in a given area it will be necessary however, to assume a given level of efficiency in each enterprise and to assume also certain practices in the conduct of these enterprises. The level of efficiency and the practices used for this purpose in most instances should be those which records have shown as prevailing in the area. This means a separation for the purpose of analysis of the two problems (1) combination of enterprises and (2) enterprise efficiency.⁶ In spite of some unreality when applied to the individual case this seems to be the only way to isolate the effects of varying the kind and proportion of enterprises in such a way that the results are of more general applicability than for the individual farm. It is entirely practicable however, to rework the analysis in terms of other levels of efficiency and other practices, if these are common enough in the area to make it worth while.

With levels of efficiency and production practices held constant, we face the problem of combining farm enterprises in such a way that the economic advantage to the farm entrepreneur for the use of his fixed resources will be the maximum attainable. Considering the interrelationships of enterprises and their demands for the farmer's resources, each enterprise will be added to the combination and in turn will be expanded in importance as long as it adds a greater net return to the farmer's fixed resources than any alternative enterprise. The net returns to be had from alternative enterprises thus act as opportunity costs limiting the expansion of any one enterprise. The limit of expansion, or "the opportunity cost limit," is reached when some other enterprise will give a higher return for additional units of fixed resources.⁷

The enterprises may be said to be in "equilibrium" when they all yield the same return for the last unit of the fixed resources used in production. Theoretically, this is our central aim in the combination of enterprises—to push the expansion of each enterprise to the same margin of profitability as the others, or the margin of equal return for the fixed resources used.

We might pursue this thought a little further to include the intensity of operation, or the limit to which we shall go in apply-

⁶ See project 8, page 109, Social Science Research Council Bulletin No. 13, Research in Farm Management.

⁷ Of course the fact that even the productive resources which for the time being are the variable factors are not available in finely divisible units limits the application here to units of change large enough to utilize a certain combination of resources.

ing the variable factors to our fixed resources. Theoretically, we might say that the combination will be expanded as long as there is any increase in net returns to the fixed resources. This is our "marginal returns limit." But practically we must remember that one of our fixed factors is entrepreneurship, and not only the farmer himself, but other family labor. If the farmers are especially hard pressed, as nearly all are at the present time, they may intensify the business by expanding enterprises as long as there is any return above the additional cost incurred. On the other hand, some farmers may be in a position to value leisure time higher than, say for instance, a return of five cents an hour for the time spent in milking three or four extra cows. Sometimes it happens that some of the resources which we have considered fixed (family labor and power, for instance) can find employment off the farm. Then the income to be had from such employment will set the limit of the return which must be had for these "fixed resources" if they are to be used in the farm combination.⁸

So far we have hastily sketched an approach to the problem of combination of enterprises by utilizing some of the economic principles which have a bearing on this question. In spite of the usefulness of such economic concepts in handling the problem, we must not forget that even when we have worked over our study on this basis we have made only a static analysis; and to repeat what we have already said, the combining of enterprises on individual farms is a highly dynamic problem.

We all realize the rapid changes in agricultural conditions which have taken place within the last decade and the drastic readjustments in farming which have been necessary as a consequence. While the bulk of the changes have come in the external economic conditions there also have been changes of considerable consequence in the other factors.

Perhaps the importance of a changing environment becomes clearer if we use as an illustration the situation in the eastern wheat area of South Dakota. Up to the end of the World War this area was considered to have as great advantages in wheat production as any other area in this country. Today even a superficial study of the situation reveals that much of the former advantage has been lost. It is true that this area still has the same climate, soil and surface. There has of course been some loss in soil fertility but in a lake bed area of this kind soil de-

⁸ See article by M. R. Benedict in *JOURNAL OF FARM ECONOMICS*, Volume XIV, No. 3, page 397-398, "The Opportunity Cost Basis of the Substitution Method in Farm Management."

pletion is not of immediate importance. Weed infestation however, as the result of continuous cropping, has become a real factor in the situation. The introduction of new varieties has made possible the extension of the wheat producing area, both in this country and abroad; but a more important factor has been the mechanization of wheat production which made possible its extension on large units of land in lower rainfall areas. Moreover, these new mechanized methods are not easily adapted to this older wheat area, largely because of its original division into farms too small in size to utilize such equipment advantageously. Other forces also have operated to increase wheat acreage not only in this country but in other countries as well; and as a result regional competition in wheat production has been greatly intensified.

The drastic changes in the price level have caused maladjustments between costs and prices which alone would necessitate a reappraisal of the advantage of wheat compared with other enterprises. As an instance of how this is brought about we might mention that as central market prices decline, and transportation and handling costs remain constant, the relative decline is much greater in farm prices of bulky commodities in which the transportation cost is an important item. Thus the alternative of feeding the low priced grain to livestock and in that way selling a more concentrated product needs to be reconsidered.

Altogether, a good many of the former bases of comparative advantage of this area in wheat production have been lost. It is possible, however, that lack of other alternatives will force the readjustment toward wheat farming on a more extensive basis; that is, with larger farms than at present and with large scale machinery.

The changes which have taken place and the probable future trends need to be classified as to their probable duration in order that the farmers in this area may have a basis for making their adjustment decisions. Commitments in the way of expenditures for the conduct of different enterprises also vary in their permanency and very often these variations can be matched into the short term, middle term and long term changes in the farm environment. For instance, if it is likely that hog numbers will increase next year to the point where the corn-hog ratio will be unfavorable to hog feeding, a short time adjustment to this change may not require any changes in the more permanent investments, but will require some changes in current operating expenses. If conditions were such however, as to favor an ex-

pansion of hog production for the next two years it might be necessary to invest in some additional hog equipment. On the other hand, if a farmer in the wheat area is trying to make a decision as to whether or not he shall add a hog enterprise to his business, such a change will require additional investment of a fairly permanent character and as a basis for the decision it is necessary to analyze all of the factors which are likely to influence the relative profitableness of hog production in this area over a period of years. For the short term, and also to a large extent for the middle term, the enterprise adjustments are likely to be largely in the nature of changes in proportions of enterprises rather than changes in kind; although some changes in kind are made quite easily such as between the crop enterprises which require the same equipment and somewhat the same amount and distribution of labor.

The question which now arises is how to proceed with a research study in the problem of combining enterprises which will: (1) take cognizance of the general principles of economics which have been developed; (2) recognize the dynamic nature of the farm business and the complexity of the business organism, and (3) get results which are applicable to individual farms.

The two oldest methods of handling the problem of combination of enterprises are the *comparative* and the *cost account* methods.⁹ It is not within the scope of this paper to discuss the points of strength and weakness in these two methods of procedure except to mention that they are not well suited to a handling of the problem according to the above outline. As commonly used, the comparative method is a purely static approach with no provision for changes in environment except by an entire re-survey of the situation. The cost account approach would have considerable validity if it were possible to arrive at strictly opportunity cost valuations for different units of the factors used in each line of production. Because of the interrelationships of enterprises this is almost a hopeless task however, and we are thrown back upon the substitution method of handling the problem.

As previously stated, the substitution method involves estimating the increase or decrease in net returns from using the fixed resources in alternative lines of production. As basic data for analysis by this method we need careful and detailed case studies of individual farms. These data should be analyzed to

⁹ Social Science Research Council Bulletin 13, Research in Farm Management, Project 8, page 110.

show the intricate relations between enterprises and the estimates of effects of variations in enterprises should be confined to closely related types. Estimates of effects of wide departures from the conditions of the study, especially in prices and yields, cannot be made with any degree of accuracy and should therefore be stated only as tentative hypotheses. If the analysis is confined to alternatives on farms of closely related types, and possessing a similarity of resources; and if too wide departures in price and yield conditions are not included, the conclusions arrived at by this method can be safely relied upon.

Of course generalizations arrived at by any scientific method will need to be tested with actual experience. Sometimes the conclusions of such a study can be verified by studying actual farms in the area which have the same, or nearly the same, combinations of enterprises as those indicated by the analysis. This is especially true if the estimates do not depart too widely from prevailing conditions. In such instances the research worker has not gone beyond the experiences of the better farmers of the area.

There is a definite place however, for the use of the substitution method in developing new hypotheses regarding the most profitable combination of enterprises in an area. This use of the substitution method has been criticized because it indicates only what someone has concluded *should happen* with a given combination of enterprises instead of what *has happened* on actual farms.³⁰ Perhaps the most pertinent answer to this criticism is that if any changes at all are to take place someone has to figure out what *should happen* in the first instance. In other words, someone has to take the lead in initiating new ideas. It seems to be merely a question of whether or not farm management workers want to assume such leadership responsibility.

Perhaps an illustration would be in order here. Some years ago when the writer was on a dairy farm in eastern Minnesota he grew the first field of alfalfa within at least a ten-mile radius of his place. Alfalfa is now grown on nearly every farm in that community and is considered an essential part of the enterprise combination. But alfalfa would have thrived just as well, and been just as good a feed for dairy cows on those farms twenty years ago as it is today. Still a farm survey of that area twenty years ago would not have shown any alfalfa on those farms and recommendations based on the survey would not have given any

³⁰ See article by V. B. Hart in THE JOURNAL OF FARM ECONOMICS, Volume XIII, No. 1, page 78.

hint that it would be profitable to add alfalfa to the enterprise combination.

To the writer it seems that instead of criticizing the use of the substitution method as a tool for the development of new hypotheses that criticism had better be directed at the failure to recognize purely as hypotheses the set-ups which depart widely from anything that has been tried in the area. Such hypotheses must be tested on actual farms before they can be relied upon. This will involve the use of some form of the experimental method.

The substitution method of procedure has also been criticized as being a trial and error method and yielding only a discrete series of results with a limited number of combinations.¹¹ This is a valid criticism to a certain extent. Research workers would do well to supply data for the gaps between the estimated budgets which are presented as results from the use of this method. However, when it comes to presentation of results as bases for application in the area studied, a small number of illustrations are likely to serve the purpose best. It must not be forgotten that these budgets are estimates of results from certain combinations of enterprises and assume a given set of conditions. Applied in the future there may be a variation in any one of the conditions assumed. There is thus not only a chance for a margin of error in calculations, but the probable occurrence of a much larger error because of changing conditions. Small variations in estimated returns are therefore not likely to be particularly significant.

A study of the combination of enterprises in an area is of little value unless the results are presented for local application. If this is to be done effectively the starting point must be farm situations as closely similar as possible to a large group of the present farms of the area, and then a means must be presented for adapting the suggestions to the individual farm. Even though we are considering farms in the same area and with approximately the same type of farming they will differ

1. As to their tenure status
2. As to their financial status
3. As to family labor available
4. As to capacity and efficiency of the manager himself as well as the other resources which he commands
5. As to special situations—such as access to additional land, opportunities for outside work, etc.

¹¹ See article by M. R. Benedict in *THE JOURNAL OF FARM ECONOMICS*, Volume XIV, No. 3, page 393.

In presenting the information to be used by farmers it is important that such differences in their fixed resources as those enumerated above be recognized. Since it is not possible to provide illustrations to fit each individual case, the aim should be to present the information in a setting that the farmer can connect with his own case, and then provide him with a means of analyzing his own farm in a similar manner. Illustrating how receipts and expenses can be budgeted on the individual farm to reflect the result of proposed changes will supply this means of analysis. The last is not an easy task, but it is believed that this approach comes closer to the farmer's own mode of thinking on the subject than any other method of presenting the problem.

DISCUSSION BY Z. L. GALLOWAY

UNIVERSITY OF KENTUCKY

Professor Johnson has presented a very stimulating discussion of the theoretical problems involved in the combination of enterprises on individual farms. No doubt all of us who are workers in the farm management field have found this topic of unusual interest just at this time.

In their effort to make a successful stand against the unusual obstacles which have confronted them since 1921 and particularly since 1930, farmers have resorted to various means, individually and collectively, of increasing the income of their individual farm businesses. These efforts have included adjustments in organization as well as improvements in technique of operation.

An avenue followed by many has been that of adjusting the combination of enterprises on the farm. Since this has seemed to offer one of the most promising means open to the individual farmer of improving his financial position we have heard a great deal about the theory of choice and combination of enterprises on farms in recent years. Professor Johnson has pointed out that recent agricultural economic literature has contributed much to this subject. No doubt further contributions in the statement of principles and in the refinement of analysis will be made since this is a fertile field of endeavor and one worthy of the best effort of those interested in the science of farm management.

Professor Johnson has suggested that the problems of choice become much more important in the "zones of division" between the well defined types of farming areas. The tendency for farmers to shift from one combination of enterprises to another has been particularly noticeable in those areas where no single enterprise or combination of enterprises has sufficient natural and economic advantages to stand out as the most profitable choice and therefore occupy the dominant place in the organization of the farms. It is within these areas that we see the greatest need for some method of estimating the probable effect upon the income and outgo of the farm of particular adjustments in the combination of enterprises.

It will be quite generally agreed that the comparative and cost account

methods of analysis are not well suited to handling this problem according to the three point outline suggested, the validity of which is not to be questioned. However, we should recognize the fact that indirectly these two methods of analysis are invaluable in the solution of the problem. In fact these methods of research, or some modification of them, are indispensable in any logical attack upon the problem.

While the writer feels that the substitution method of analysis is the best means yet suggested for measuring the most profitable combinations of enterprises on a given farm, he feels that all the safeguards possible should be used to avoid misinterpretations and erroneous conclusions. The conclusions drawn from this method of analysis can be no more reliable than the data upon which they are based. It is also important that the basic price and production data should be presented in such a way that the accuracy of the conclusions can be readily checked by the casual reader.

It is quite evident that it is necessary to assume certain practices in the conduct of the enterprises and a given level of enterprise efficiency if we are to arrive at decisions of general applicability as to the most remunerative combination of enterprises. However, I should like to emphasize the fact that in doing so we may introduce an unreal condition which will tend to invalidate the conclusions. The more nearly these assumed conditions coincide with best crop and livestock practices in the area as demonstrated by workers in these fields, the less unreality there is involved and consequently the less likelihood of introducing bias in the conclusions. This merely emphasizes one of the conclusions drawn early in the paper that "we need to coordinate our work in farm management with other agricultural research work, especially that of agronomy, animal husbandry, and engineering."

It is not logical to assume that farmers will adjust the combinations of enterprises on their farms to the point which will give the operator the highest possible economic advantage for the resources under his control and not adjust the practices involved in handling these enterprises to a level of efficiency somewhere near the point of highest profit. In many cases we find the two so closely tied together that it is not possible to make improvements in the combination of crops without first making adjustments in practices in the production of those crops. In other words the basis for the improvement in organization is improved practices which result in greater enterprise efficiency.

Our experience with the estimate method of analysis has led us to believe that the suggested organization serves more as a general objective or point of arrival than as an exact goal. This is particularly true when the analysis is made from a long-time standpoint and when the suggested organization departs rather widely from the existing organization. From time to time as adjustments are effected in the combination of enterprises there is opportunity of correcting for errors of estimate as well as for variations in any of the conditions assumed.

Professor Johnson has very aptly stressed the fact that estimates of the effect of variations in combinations of enterprises which vary widely from existing conditions in the area, should be stated as tentative hypotheses until they can be tested and substantiated under farm conditions. I realize that it is rather difficult to get the suggested combinations

of enterprises duplicated on individual farms in an experimental way. The fact that individual farmers with mental, physical, and financial limitations and with the inertia of doing things in the old way, must be dealt with in such a study is a distinct handicap which must be overcome. In addition five to ten or more years are required to make the adjustments and secure results which are dependable and show the influence of variations in weather conditions and price relations from year to year. This makes it even more difficult to secure satisfactory co-operators who will follow plans consistently throughout the period. It seems, however, that many of the difficulties may be largely overcome if the project is set up in connection with the extension work in farm accounts. By this means greater selection is possible and contact can be made with farm managers in the area who are interested in replanning the farm organization and who have in addition the ability and "will" to execute the plans. Also it is often possible to locate farmers who have made considerable progress toward the suggested combination of enterprises even though it constitutes a considerable departure from the common enterprise set-up in the area.

I was interested in the suggestion that what we are seeking in measuring the comparative advantage of different combinations of enterprises on the individual farm is the "highest profit combination" of enterprises. While this phrase is very expressive of the meaning intended and quite true except in perhaps unusual cases, I wonder if its use in this connection is not likely to become confusing, especially to students since we have come to associate the expression "highest-profit combination" with the proportioning of the factors of production and the law of diminishing returns.

In conclusion, I think it is interesting to raise the question, which very naturally comes up in this connection, as to how closely the farmer can approximate the most efficient combination of enterprises on his individual farm with his present means of arriving at this much desired end.

FUTURE TRADING IN BUTTER AND EGGS¹

C. A. BROWN

UNIVERSITY OF ILLINOIS

The origin of future trading in the United States dates back to the period just prior to the Civil War when future transactions were made in grain and pork. Trading in cotton futures began near the close of the sixties, cottonseed oil in 1904, and sugar in 1919. Among the commodities that have been added to the future list since the World War are butter, cottonseed and cottonseed meal, eggs, hides, mill feeds, milk, tin, and copper.

This type of trading was an outgrowth of "to arrive contracts" in grain trading which were quite common during the fifties. The chief difference in trading in spot grain and "to arrive contracts" is that in the latter case a brief lapse of time occurs before fulfillment. These contracts provided a broader field for speculation and were more convenient than spot trading. They permitted the practice of short selling. At the beginning trading in "to arrive contracts" lacked standardization. Practically no specifications were made regarding size of trading unit established grades, and delivery options. Constructive rules and by-laws regulating trading also were lacking. The future contract of today is highly standardized. Trading units are definitely determined for each commodity, quality is regulated by established grades, and the seller is given the option of selecting the day of delivery and the grade that is delivered. These and other carefully drawn rules and regulations determine the type of agreement for the buyer, seller and broker.

Wheat and cotton are the outstanding commodities in future trading. In 1929 grain futures constituted two-thirds of all commodity future trading which amounted to approximately 42 billion dollars. Grain, together with cotton, constitute 92 per cent of the total value of futures. Approximately three-fourths of the future trading in 1929 was transacted upon the Chicago Board of Trade and the New York Cotton Exchange.

Trading in butter and egg futures began upon the Chicago Mercantile Exchange in December, 1919. During the first year of its operation, transactions in futures included 11,000 cars of eggs and 4,000 cars of butter. For the year 1929, these transactions amounted to 47,398 cars of eggs and 15,216 cars of butter. Spot trading is less than 5 per cent of the total trading value.

The New York Mercantile Exchange began trading in butter

¹This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 29, 1932.

and egg futures in 1925. The trading output for the year 1929 was 5,853 cars of eggs and 36 cars of butter. The trading unit on both exchanges is the carlot, which contains 12,000 dozen eggs or 19,200 pounds of butter.

On the Chicago Mercantile Exchange the basic grade for butter is storage or fresh standards and for eggs, storage packed and refrigerator standards. The deliverable grades of fresh or storage butter range from 88 to 93 score. Scores are determined to the nearest half. For example, a lot of butter with a score ranging between 89 and 90 would be scored 89½. Miscellaneous lots as well as straight cars may be delivered according to certain definite specifications. Price differentials consisting of premiums and penalties above and below the basic grade are established between deliverable grades. Penalties are relatively larger than premiums. Deliverable grades of eggs may be refrigerator, ordinary firsts, or better. As is the case of butter, penalties are relatively higher than premiums so as to encourage delivery of the basic grade. Grades are determined by Exchange inspections unless other arrangements are made. Charges are made by the Exchange for inspections. The minimum brokerage rates for non-members of the Exchange are \$50 per carlot of butter and \$30 per carlot of eggs for the purchase on exchange or sale on exchange or the purchase and sale on exchange when transactions are settled by offset. The rates for members are one-half of non-member rates. Rules and by-laws and various other specifications too detailed to mention in this discussion are employed to regulate future trading on the Chicago Mercantile Exchange.

The most important service rendered by future trading is hedging. Hedging in commodities is comparatively simple. It enables the dealer to shift certain risks inherent in commodity merchandising. In certain stages of merchandising there is the risk that market prices of cash commodities will change unexpectedly and bring about a substantial loss unless this risk is offset by setting up another as a counterpart. The existing risk must apply to actual commodities and may be hedged by a transaction in the future market and thereby avoid the risk of unforeseen price changes. Hedging in butter and eggs may be advantageously employed by the shipper, packer, manufacturer, receiver, and storer. As an illustration from the standpoint of the shipper, it may be assumed that a shipper from Indiana wishes to send a car of butter to market. If the price at the city market were to remain unchanged until the car arrived and was

sold, a fair profit would be made. By selling a car on the future market of the Chicago Mercantile Exchange in the current delivery month the shipper can almost entirely eliminate the speculative factor resulting from a material price change. It may be assumed that the butter cost 20 cents a pound, futures were 24 cents, and the spot market was 25 cents on the day of shipment, and further upon the day of arrival futures had declined to 23 cents and the spot market to 24 cents. A decline of one cent a pound would amount to \$192 per car. The shipper, however, was able to buy back his future purchase at a profit of \$192 minus brokerage provided the price differentials between grades on the spot and future markets had not changed. Obviously, if instead of declining, the market upon spot and futures had risen one cent, the shipper would have sold the butter for a gain of approximately \$192 above the 24-cent price and lost \$192 plus commissions upon the future transaction. Under these conditions hedging is rather inexpensive risk insurance.

The following is a typical example of hedging by the manufacturer: A creameryman during a particular summer season produced 50 cars of butter at a cost of 36 cents a pound including storage charges. By selling 50 cars for November delivery when the price was quoted at 38 cents a pound he made a net profit of approximately \$19,000. If the manufacturer had not hedged he would have faced a very large loss since a material decline in the prices of butter occurred, November futures having declined to about 31 cents. In November, he had the choice of delivering the butter on the contract or to offset his future transaction by a purchase, and sell the butter in the open market.

Hedging may be employed to expand credit for commodity merchandising. Filling warehouses through credit expansion resulting from hedging transactions is frequently practiced. In 1930 an egg shipper with limited means wished to store several cars of eggs which number was sufficient to fill the warehouse. The warehouse manager, however, was doubtful of the financial standing of the shipper and the firmness of the market. By hedging the eggs as soon as purchased, the shipper was able to finance the deal and the risk of loss from declining prices was eliminated. In the latter part of the season only a limited supply of eggs was available. Future prices began to advance. Immediately the hedges were removed and the transacting parties became speculators when it was positive that a substantial seasonal rise was in process.

Although the hedger shifts the risk inherent to an adverse

change in the general price movement he incurs a smaller risk resulting from a relative change between cash and future prices. These relative price changes may react favorably or unfavorably but may counter-balance each other over a long period of time. If, however, the hedger uses all of his available credit his losses may be sufficient to bankrupt him. Hedgers who are not skilled and experienced in dealing with relative price changes usually operate at a great disadvantage. For those who are skilled these relative changes may react to their advantage.

The large number of speculators trading on the future produce markets enables dealers in actual commodities to hedge extensively, since speculators are willing to assume the risks in anticipation of favorable changes in prices. As long as speculators are well informed regarding fundamental price conditions and trading is well distributed, prices will closely reflect actual values. Prices may be thrown out of line, however, by traders who are guided largely by sentiment chiefly on account of their unfamiliarity of fundamental market conditions. Concentration of a relatively large interest in the hands of one or a few traders may also cause unwarranted price disturbances. The latter condition may be employed to force the shorts to cover at unduly high prices especially if the deliverable supply for the current month is relatively small in comparison to the short interest.

Squeezes occur rather infrequently on the Chicago Mercantile Exchange. The occurrence of these undesirable market features has been rendered much less likely by the adoption of certain provisions. Squeezes can be more easily executed when only the standard grade suffices for delivery. Since the adoption of the provision whereby several grades may be delivered upon future contracts, squeezes have occurred much less frequently. Provision for delivery upon future contracts at other points than Chicago also enlarges the deliverable supply and thereby decreases the intensity of squeezes. It is provided, however, that the sellers bear the freight differential between Chicago and the outside point of delivery and a penalty of 30 cents a case on eggs and 45 cents a tub of butter. It is apparent that this provision is disadvantageous from the standpoint of butter and eggs located at eastern storage points. Freight adjustment on the basis of proximity to the point of consumption would largely correct this difficulty. This adjustment together with a reduction in the penalty would reduce the extent of market manipulation that sometimes occurs in the latter part of the closing month of any future.

Some exchanges have gone so far in their effort to eliminate

market manipulations that they permit track delivery in addition to delivery in warehouses. Track delivery, however, is usually limited to the last three days of the delivery period. It is doubtful, however, if this method is needed to prevent market manipulation in future trading in butter and eggs. The method would increase the uncertainty inherent to delivery and might even cause congestion in the local shipping yards.

Delivery within a relatively brief period following the close of trading in the contract in question would eliminate much market manipulation. Speculators could close out their open contracts or shift to more distant months. The remaining open transactions could be closed by an exchange of the commodity. It is possible, however, that such a system would not constitute delivery according to law.

The system employed in establishing differentials between deliverable grades is of vital importance to future trading. Broadly speaking, three are employed, namely: the fixed, the periodic, and the commercial difference systems. The periodic system is used by the Chicago Mercantile Exchange. By a vote of the membership, differentials are established for the period of each open contract. They are established in such a manner that it is generally profitable to deliver the basic grade, that is, premiums for deliverable grades better than the basic grade average less than corresponding ones in the spot market, and for the inferior grades the penalties average larger. Fluctuations in differentials, however, may occur which materially change the alignment between spot and future prices. Chiefly owing to the large seasonal variation in the production and consumption of butter and eggs, there is much seasonal variation in price differentials between grades. For the period 1926-1930 the seasonal range in price differentials between butter extras and standards was from 0.05 cents in April to 2.65 cents in November. They averaged lowest from February to July. Differentials, however, between butter standards and the poorer grades, relatively do not vary quite as much. Under these conditions the differentials between prices for different grades of spot butter sometimes exceed the fixed differentials, which condition exerts a downward pressure upon futures, since future prices reflect the grade that is most likely to be delivered. This difficulty could be eliminated by the use of a system whereby differentials would be determined daily from the price spreads between grades of spot butter. This system assures the buyer and seller that if any grade other than the basic grade is delivered the differentials will be adjusted on

the basis of prevailing spot prices. The principle involved in this system is the same as that established by the Federal Cotton Futures Act. The act provides that differentials between deliverable grades of cotton shall be determined from spreads between spot prices of corresponding grades of cotton in certain designated markets. The Secretary of Agriculture designates 10 cotton markets from which to calculate the differentials. A committee meets daily on each market and after a careful consideration of the major price factors decides what shall be the price quotations of the day. These are telegraphed to the United States Department of Agriculture where the average differentials are calculated so that they may be used in the next day's transactions in all the cotton markets.

Future trading has been the source of much political agitation since its inception. This is particularly true in respect to grain and cotton. Much of this has resulted from a lack of knowledge of its purpose and the service rendered. It is rather generally conceded, however, that part of the criticism is just. In the past, the lack of speculative foresight and the application of artificial factors at times have caused prices to deviate materially from actual values. Producing agencies particularly have been very sensitive to such practice. They have retaliated in part by sponsoring producer cooperation. Whether cooperation will supplant our competitive system of marketing will depend largely upon which system is more efficient and serviceable. One of the most effective means of bringing about reform in future trading is to hold in abeyance that part of the wholesale trade which sacrifices constructive marketing for the sake of commissions.

DISCUSSION BY E. A. DUDDY
UNIVERSITY OF CHICAGO

I have only one comment to make upon Professor Brown's excellent paper; that is with respect to the results which may reasonably be expected from a hedging operation on the Chicago Mercantile Exchange. Protection against losses from price fluctuation by this means is not automatic and I do not believe that Professor Brown meant to leave that impression.

To test the potential effects of hedging, the net profit or loss resulting from a "straight hedge" of a merchandising operation in the cash market for eggs was calculated for 1927, 1931 and 1932. The net profit or loss was arrived at by offsetting profit or loss on the cash operation (less carrying charges) against the profit or loss on the hedge sale, less commissions. Weekly average prices were used, the hedge being placed by the sale of a future contract when the eggs were put in storage, and removed when the eggs were taken out by a purchase of the future con-

tract. In 1927 and 1931 the November option was used for hedging; in 1932 the October option was used. The eggs (carlot unit) were charged into storage in each successive week of March, April and May, and charged out from the beginning of the heavy out-movement in September through each successive week until the end of January.

Theoretically, the merchandising profit as well as the carrying charge should be reflected in the spread between the cash and future prices when the hedge is placed on; the net result of the off-setting transactions, if the market works perfectly, will be zero. For if prices get out of line when the merchant wishes to take the hedge off in the fall months he can still deliver on his contract. Since the expected profit ranges from one-half cent to a cent a dozen, a $\pm \$50$ profit or loss a car (amounting to about \$0.0004 a dozen) was taken as a measure of satisfactory performance in the straight hedging operation.¹

In 1927 the cash deal showed profits in all but 12 out of 132 possibilities of storing for profit; potential profits ran as high as \$550 a car. Using a straight hedge resulted in complete elimination of profits and the accumulation of losses from \$48 to \$419 a car. On the $\pm \$50$ rating, the hedge worked satisfactorily in only two out of 132 instances.

In 1931 the cash deal showed losses in all possible periods of storage, the average loss running to \$675 a car. The net result of the straight hedge was to eliminate losses in all but 29 of the 91 possible storage periods. In only seven of these periods did the loss run above \$50 a car. Hedging profits above \$50 were realized in 26 periods. Thus the straight hedge worked satisfactorily within the $\pm \$50$ range 60 per cent of the time.

In 1932 the results for January, 1933, are not included because January cash quotations were not available. The cash deal through December showed profits in all of the 165 possibilities of storage that were analyzed. Potential profits averaged \$986 a car. The net result of a straight hedge was to reduce all profits greatly and to convert profits to losses in 27 of the possible 90 cases in which profits were realizable. In only one case, however, were losses above \$50 a car. Hedging profits above \$50 were realized in 43 of the remaining 63 periods which could be hedged in the October option.

It hardly needs to be added that the successful outcome of the straight hedge depends not only upon the relation of the carrying charge to the cash-future spread in the spring months when the eggs are moving in, but also to the cash-future price relationship in the fall and early winter, and the willingness of holders of "long contracts" to take delivery.

¹ For a more complete discussion see "Profits and Losses in Egg Storage," Evard A. Duddy and David A. Revzan, *The Journal of Business*, July 1933.

EXTENSION IN COOPERATIVE BUSINESS MANAGEMENT¹

(SMALL COOPERATIVE ORGANIZATIONS)

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About 190 cooperative business organizations are operating in New York. About 100 of these are individual cooperative purchasing or marketing associations and the remainder include the Dairymen's League Cooperative Association, Inc., and the Farm Service Agencies of the Cooperative Grange League Federation Exchange, Inc. This paper gives consideration to extension work with these smaller individual cooperatives scattered throughout the state doing a wide variety of business.

INDEPENDENT LOCAL COOPERATIVE ASSOCIATIONS IN NEW YORK, 1929

	<i>Number of organizations</i>	<i>Membership or Total</i>	<i>patrons Average</i>
Farm Supplies	39	8,085	207
Fruit	29	3,267	113
Dairy	14	2,216	158
Vegetables	12	1,403	117
Miscellaneous—Marketing	10	1,226	123
Service	5	1,400	280
	109	17,597	161

Effective extension work with nearly any of the organizations has an influence on the income of more than 100 members. An increasing number of these associations are handling farm supplies as well as marketing farm produce in order to render a greater service to the community at a reduced cost per unit of product.

The officers and directors of cooperative associations usually look to the State College of Agriculture for help when they find themselves in financial straits. Unless a definite extension program is planned and executed for cooperative associations the economist's chief rôle is likely to be that of coroner and counselor for the administrator of the estate. By means of an educational program in business management, the extension service may not only preserve the farmers' investment, but further increase the efficiency of these business organizations and thus increase the returns to producers.

The failure of many a cooperative endeavor is due to mis-

¹ This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 28, 1932.

understanding concerning the objects and purposes of the enterprise. Members are likely to expect impossible or unreasonable accomplishments because they look upon their organization with more emotion than practical business-like judgment. Frequently officers and directors are largely responsible for this attitude and too often these leaders fail to realize that to render a permanent service a cooperative must fill a real need. The emotional approach has been the cause of much poor thinking and many false starts.

The purpose of cooperative business is to increase the income of cooperators. In general, the farmer buys at retail and sells at wholesale. As individuals, few farmers are in a position to buy in economic units and to sell in sufficient volume to market most economically. The savings to be gained by quantity purchases of farm supplies have led to the formation of many cooperative purchasing organizations. Cooperative marketing organizations have been established to assemble, grade, pack, and sell farm produce. In many instances, the purchasing of supplies and marketing of farm produce are carried on by the same organization using the same facilities thus reducing the overhead cost per unit of product.

One of the chief objectives of cooperative business is to obtain services at costs below those of existing agencies. In 1929, New York farmers spent nearly \$89,000,000 for feed and fertilizer. This was 23.4 per cent of the cash farm income for that year. The purchase of satisfactory feed, seed, and fertilizer is a major problem with most New York farmers. The high manufacturing and distribution costs in the handling of feed and fertilizer have been chiefly responsible for the development of several purchasing organizations in the northeastern states. The chief aim of these cooperatives is to reduce the costs of handling farm products and supplies, through (1) reduction in labor costs per unit of product, (2) operating with fixed property costs at a minimum, (3) elimination of credit costs by operating on a strictly cash basis and (4) reducing risks and losses by maintaining an inventory of the size and kind that will permit of rapid turnover.

Another aim of cooperative business has been to obtain services not previously available, such as seed of known origin, open-formula feed and high-analysis fertilizer, uniform grading and branding, the adoption of standard containers, and the elimination of wasteful and expensive practices.

Many cooperative business associations do a considerable

amount of educational work with members in recommending production practices to obtain a more uniform product at lower cost that can be marketed at a relatively higher price.

The individual cooperative purchasing units have many common problems but no facilities for exchanging the experience gained by these organizations in solving these problems. The small cooperative association is not in a position to employ a highly trained supervising accountant. Usually they employ as bookkeeper one who is inexperienced in making and analyzing financial statements, because the chief objective is to get the "bookkeeping" done at a low cost.

One way to obtain a more complete analysis of the business would be to secure the services of an expert in cooperative business management. Such experts are scarce and their services can be had only at a relatively high cost. Another way to get the desired analysis is by training the accountant to work out the important comparisons. This is a job in adult education for the extension worker. The extension service also offers a medium through which the experience of one organization can be used as a basis for determining the policies of other cooperatives.

It is not uncommon for the directors to meet to elect officers, select a manager, and personally sign notes due the bank, but assume little additional responsibility concerning the operation of the business. One frequently hears the statement made by a director, "Don't ask me, I don't know much about this. We hire a manager to look after that." The directors of these small cooperative associations have had little or no experience in operating a business of this kind and know relatively little about accounting systems and business analysis. As leaders responsible for the destinies of the business and the selection of the manager, the directors should be trained in cooperative business management and know how to measure the efficiency of the enterprise.

The aim of extension work with these organizations is to teach the officers and directors, as well as the manager, the essentials of successful business management and how to analyze their own operations and plan for the future by a careful study of the business. This educational work is incomplete unless through the officers and leaders the membership is also informed of the part they have to play in the success of the business. In order to attain this goal the educational program must be effective in bringing about the changes in the business designed to increase the efficiency.

When extension work is started with a cooperative organiza-

tion, the first step is to take stock of the situation. This cannot be accomplished satisfactorily if the accounting system is inadequate. The sole aim of the accounting of most associations is to keep a record of charge accounts and the necessary information for annual reports required by the state at the lowest possible cost. Because of this situation the accounting systems are distinctly unsatisfactory in more than half of the cases. In most instances, some alterations in the system will provide the necessary information in a much more useful form with little or no increase in the accounting cost. No unnecessary changes are proposed. A drastic change sometimes results in a lack of interest on the part of the bookkeeper and manager.

In so far as appears feasible the same accounting system is set up for all cooperatives. This permits of a comparative analysis that may be very useful to each of the organizations.

One of the provisions of the cooperative law in New York calls for the filing annually of a balance sheet and operating statement with the State Department of Agriculture and Markets. Many of these statements are prepared by the manager or a local bookkeeper or bank clerk. The annual audit is made generally by a committee of members, many of whom are elected or appointed without much consideration of their qualifications for this particular task.

The most desirable procedure is to have the audit made by a certified public accountant and this is recommended to the Board of Directors. The chief limitation in this procedure is that these certified public accountants, although well trained, have had little experience with cooperative business and sometimes fail to prepare a statement and analysis of the most value to an organization in business for service and savings to its patrons, rather than for profit. If the extension specialist makes the audit, in spite of all precautions, the institution he represents is likely to be held responsible for errors that may develop. The extension economist may help to interpret the audit made by the certified public accountant and plan an educational follow-up with the directors and members.

The analysis of these statements and the relation of these facts to available research offer an unlimited field for the extension specialist. By a careful study of the particular cooperative, a comparison with other cooperatives doing a similar business, and the results of research, the extension economist may help the directors and manager arrive at changes that should be made and determine policies for the organization.

If, after due consideration of the facts, the directors do not accept the recommendations of the extension specialist a more complete study should be made of the issues in question. The judgment of a well qualified board of directors may be relied upon.

The specialist may guide and direct the analysis of special problems, such as the cost of credit, the effect of credit limitation on sales, profitableness of various lines of goods purchased or produce sold, and the cost of operating a trucking service for patrons.

A final and important step in this work is the task of informing the membership concerning the factors for successful operation of their business and what the individual member can do to decrease the costs and increase the service and saving. It is essential that the membership be taken into confidence, informed of the problems as well as the accomplishments, solicited for support in carrying out certain policies and plans, and encouraged to make suggestions and otherwise show an active interest in the business.

Often accounting assistance must be given before the business can be analyzed satisfactorily. Records for a period are essential to the preparation of the statements necessary for analysis. These records are not available in many instances and therefore a change must be made in the system of accounts. For this reason, during the first year or two more time must be given to accounting than will be necessary in future years.

During the past year the following types of assistance have been given New York cooperative associations:

1. Accounting
2. Preparation of financial statements
3. Business analysis for directors
4. Budgeting and financial planning
5. Special state and federal reports
6. Reports to members
7. Organization of new cooperatives
8. Miscellaneous (contracts, credit problems, etc.)

Illustrations may serve to clarify the procedure commonly followed.

Late in 1929, Cooperative A requested help in making some changes in their system of accounts. They had no definite idea of the changes that should be made. The request was received near the close of their fiscal year, so financial statements were prepared from their old books before changes were made. The

new books were set up and help given at periodic intervals in keeping the records properly. Trial balance statements were sent to the extension specialist monthly.

At the end of the year financial statements were prepared and the results of operations discussed with the directors. In 1931, the report made to directors took the form of a complete analysis of operations and comparison with the previous year, also a comparison was made with similar cooperatives. Recommendations were made to the directors concerning changes in policy designed to increase efficiency. These recommendations were supported by material given in the report. The directors then helped prepare a report to members.

Several changes in policies of management have resulted in lowering the costs of operation. In 1931, the total costs of operation were 3.3 per cent of net sales less than the average for similar New York cooperatives. The volume in 1931 was 29 per cent above that of 1929, as compared with only 19 per cent for the average of similar New York cooperatives. The members' net worth for the fiscal year ending in November 1932 was about 90 per cent of all assets compared with 50 per cent in 1929.

Activities in which the extension service cooperated with officials and members of the organization include:

1. Setting up a new system of accounts. The time involved in keeping records has been reduced over 25 per cent.

2. Checking up on bookkeeping at monthly intervals until the new system was thoroughly understood.

3. Compilation of financial statements for the fiscal years 1929, 1930 and 1931, and semi-annual statements for 1931.

4. Analysis of the financial statements based on a comparison with statements of similar organizations for the fiscal years 1930 and 1931.

5. Conference with directors to discuss the analysis. Also discussion of the budget for the following year and possible changes in management policies, together with their probable effects on efficiency.

6. Meeting with members at which the directors presented the same information to them. Preparation of a special report for members.

7. Change in credit policy of the organization. A conference was arranged between directors and bank officials at which the new credit policy was explained to these officials. The purpose of this conference was to aid those members who would later request a bank loan to replace credit formerly extended by the

cooperative. Arrangements were made for members to use the Cornell Farm Inventory and Credit Statement forms in establishing credit relations with the bank.

A total of only about 12 days have been spent in the field with Cooperative A since this work was started. As the manager, accountant, and directors become more proficient less time will be required with this organization. However, with changing personnel it is expected that each of these cooperatives will call for assistance from time to time.

During the past year, work was started with Cooperative B as a result of a complaint made by a member who had not received payment for his product sold through the seasonal pool. A study of the situation revealed that the deductions were not sufficient to carry the overhead of the association during the period when little produce was sold, and some farmers' checks were held up until the succeeding season renewed the income. Incomplete and curiously arranged financial statements were looked upon with suspicion by bankers.

By preparing statements which the banker could understand a line of credit was established by which the association could settle with all members at the close of the marketing period. The accounting system was changed to permit drawing off up-to-date statements upon short notice. A reserve was established to provide for carrying a skeleton organization during the inactive period of future years.

These two illustrations may suffice to indicate the type of work undertaken in New York. In all of this work the extension specialist keeps in close contact with the county agricultural agent. Many of the requests for assistance come through the county agent and the agent is frequently called upon to assist in carrying out the educational program of the cooperative. The agent receives copies of the statements and the analysis of operations.

It is important that cooperative associations unwisely established, and organizations that have completed their usefulness be dissolved before large deficits have accumulated. Post mortems reveal that far too many of these businesses continue to operate at a loss until members and particularly directors suffer severe financial reverses. There is nothing wrong or unbusinesslike in closing up the affairs of an association that has fulfilled its purpose and can render no compensating service to the community.

The extension work in business management is not necessarily confined to cooperative business enterprise. Many of the rural

business concerns selling farm supplies and handling farm produce could operate their businesses more efficiently, and by so doing they would be in a position to handle farm supplies and produce on a lower margin and thus increase the returns to farmers. Business management assistance has been requested by and given to several feed dealers.

Extension work with independent local cooperative organizations is chiefly that of training officers, directors, employees, and members in successful business management. This involves the establishment of an adequate accounting system, the analysis and interpretation of financial statements, the determination of sound and far sighted financial and business policies, and the effective execution of these policies through the cooperation of an informed membership. In so far as this undertaking is successful the extension specialist affects the income of many rural people who make use of the facilities of cooperative organizations.

EXTENSION IN COOPERATIVE BUSINESS MANAGEMENT¹

(FOR LARGE COOPERATIVE ASSOCIATIONS)

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Extension in cooperative business management is one of the more recent types of service offered farmers by colleges of agriculture. Development of this form of extension for district and regional cooperatives came later, and naturally so, than for small, local associations. The Division of Cooperative Marketing, formerly in the Bureau of Agricultural Economics at Washington, D.C., and later part of the Federal Farm Board, assisted a number of regional associations with their business management problems and was probably the first public agency to develop this type of service for large cooperatives.² In the past three years some assistance along this line has been rendered in conjunction with the extension of loans by the Board.

In many respects extension in cooperative business management is a combination of research and extension, and to be most effective it should be handled in this manner. The analysis itself might be delegated to the research worker and the presentation to the extension specialist, but where the functions are so closely correlated it is desirable, if possible, that they be handled by the same person. The importance of case studies as part of this service can hardly be over-emphasized as large corporate businesses are not sufficiently standardized for one to apply economic principles without a thorough understanding of the particular problems of the individual association.

Suggested Approach

The problem before the extension worker may be such as to require an analysis of the general organization and its operations. This is no simple piece of work and its direction is not charted. For example, an analysis of the National Cheese Producers' Federation in the summer of 1931 contained a rather complete statement of the financial condition of the organization

¹ This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 28, 1932.

² An early example of this type of service is an economic analysis of the Staple Cotton Cooperative Association by A. V. Swarthout, and another is a study made by Kelsey S. Gardner of the Deciduous Fruit Marketing Contract between the California Fruit Exchange and the California Fruit Growers Exchange. The findings in both cases were published in 1926 by the Division of Cooperative Marketing of the Bureau of Agricultural Economics; the former as Circular 397 and the latter as a Confidential Report to Board of Directors of the California Fruit Growers Exchange. The one study, as can be gleaned from the title, deals with one major problem and the other deals more with the general operations of the association.

and a review of its general policies. Special consideration was given the Federation's grading program, warehousing costs, and assembling charges on cheese. This study took fully two months to complete and prepare for presentation. Time did not permit a comprehensive analysis of the sales department, supply department, administrative and general expense, accounting practices, or of the organization's experience in supervising and operating creameries and cheese factories. It is therefore evident that unless one has a liberal amount of time at his disposal that a business analysis of a large association must of necessity be limited in its scope and its objective clearly defined. In fact, it is usually best to take as one's objective the solution of one or two specific problems.

Another prerequisite to a study of this kind is that there be a clear conception on the part of the association to be studied and on the part of the extension specialist as to how the information will be handled. A cooperative association like a private business has certain data and information which are not to be treated as public property. Large cooperatives usually guard their information far more closely than do smaller associations. Frequently some of the findings must be kept within the directorate, and the management. While this point can easily be overstressed, it may be well to suggest that as a matter of policy the distribution of any published reports be made by the association itself or only with its full approval.

Still another rule that it is well to adhere to is that the request for an analysis of this type should come from the board of directors. One's allegiance should be to them and not to a single officer or manager. The report itself should likewise be presented to the board. In this manner the personal factor is less likely to enter.

It is highly important that the analysis be of a factual nature and that the conclusions be limited very largely to an interpretation of facts and to well defined questions of policy. The extension specialist should never find himself in the position where he attempts to govern the activities of the cooperative or promote its program indiscriminately. He can support facts and principles, but the decisions must necessarily rest with those immediately concerned. The specialist has no control, and should not have, over the personnel of the organization. He therefore should bear in mind that the execution of even a sound policy may be so faulty that the policy itself is of little value.

Detailed Analysis Helpful

A business analysis of the type suggested here frequently deals only with the more general problems of management. The analysis of the Cheese Federation, for example, indicated rather clearly the need for economy in several directions. One of the suggestions in the report was to the effect that a consolidation of cheese warehouses should be undertaken and data were presented in support of the advisability of this procedure. Later, however, when it was actually decided to consolidate the warehousing operations it became necessary to extend the analysis to show which warehouses should be closed. This called for information not only with reference to the relative efficiency of each plant, but also the general condition of the building and equipment, desirability of its location relative to the factories to be served, advantages in freight rates, etc. How many warehouses would it be necessary to close in order to obtain the maximum net economy when consideration was also given to the probable increase in assembling costs on the cheese due to the increased hauling distances from factories to the warehouses? In answering this question it was found that the entire territory could be served advantageously from six warehouse points instead of fourteen. In all but one instance the economic data alone indicated rather clearly which warehouses ought to be discontinued.

Presentation to Members

The extension specialist may be called upon by the management of a large cooperative association to assist in presenting information to its membership. If an analysis of the organization or of some particular business problem in the organization has been made by the specialist himself, he is in a most favorable position to appear before the members. As one man remarked at the close of a meeting, "Had the manager or president said the things you did, we would probably have thrown him out, but since you have no personal interest in the matter and seem to have the facts we are inclined to believe you." Two large cooperative associations which began operations less than three years ago in Wisconsin and which have several hundred members each attribute part of their success to a well-informed membership. Assistance was given the management of these associations in the analysis of their early operations and in the presentation of this information to what was then a most critical audience.

Control Accounts and Budgets

Another way in which the extension specialist can assist in cooperative business management is to help farmers' organizations in setting up operating budgets and periodic control accounts. In most large associations the operating expenses can be classified according to functions or departments and critically examined. An operating budget can then be set up and the unit expense checked in detail against previous operating periods. This method is more effective than simply analyzing last year's accounts, since it acts in the nature of a preventive for excessive expenditures rather than merely an explanation of previous operations.

One common fault in the accounting departments of cooperative associations is that the records are not made to serve their full purpose. Most of the accounting is only plain bookkeeping and the information contained in the records is not analyzed and made to yield the essential facts that will give an accurate and complete picture of the business operations to the management. The accounts should not only be made to serve this purpose occasionally, but they should be available in this form at regular intervals and as often as needed. Some of these reports should be made daily, some weekly and some monthly. There is seldom, for example, an adequate reason for not having an operating statement and balance sheet for the organization and perhaps also for each major department at the end of each month. The number and kinds of other control accounts will depend upon the type of business and the particular organization. An extension specialist in marketing has the opportunity to aid in developing this phase of good business management or what one might term proper internal control in the organization. The manager of a large cooperative association in Wisconsin recently testified to the value of this service and even went so far as to state that it gave them a control over their business operations that they had never experienced before.

Inter-Cooperative Relationships

Another way in which the extension worker in marketing can serve is in developing and maintaining a friendly relationship among cooperatives. Fortunately demands along this line are not frequent, but when such cases occur they require the utmost tact. Examples of this type of problem may be found between city milk marketing groups and dairy manufacturing groups.

Frequently the policies of the one on the control or expansion of markets or on prices for fluid milk and manufactured products are in almost direct conflict with those of the other. Difficulties may also arise where two large cooperatives are competitors in the same territory or where some of their services overlap. The extension specialist, who has the good will of both parties, may render a valuable service in bringing them to a point where they understand each other's point of view and are willing to iron out their differences in some peaceful manner. This may not be a cooperative business management problem, but it is nevertheless closely related to it.

Formulation and Appraisal of Policies

If cooperative business management includes the formulation and appraisal of policies as well as the execution of them, then the specialist has even a broader opportunity to assist cooperatives with their management problems. This phase of the discussion was purposely left until the last because my experience has been that one cannot go to a cooperative and immediately criticize its policies. On the other hand, after one has aided an association in solving some business problem that has been particularly troublesome, he is in a better position to understand the organization and to examine its general program. The management will likewise have more confidence in his suggestions.

The latitude one has in this phase of cooperative business management depends upon the individual's tact, his ability to see and analyze the situation and upon the need of the cooperative. In one case the problem may pertain to the financial policy on credit, advances to patrons, reserves, or retirement of debt. In another instance it may be a lack of policy governing the activities of the individual directors as to their employment in the association or their entrance into the political field while they are still directors of the organization. This question may be less embarrassing for an outsider to bring up for consideration than for the manager or a director. One can do this by pointing out the dangers of permitting this practice to continue and suggest that a precedent be established. Other problems may relate to the central organization's policy towards its locals. Perhaps its operations tend to favor the small local over the large one or vice versa, or perhaps the policy tends to over-centralize the activities. Some part of the sales or membership program may need a change. These possibilities are stated here to show both the variety of problems and the many opportunities for service.

Again it may be well to emphasize that the extension worker's position should be that of attempting to analyze the effect of certain policies or a lack of them over a period of time and to present his analysis to the directorate. The decision for adoption of policies should by all means be left to the cooperative itself.

Measuring Results

This discussion has emphasized that extension in cooperative business management should be of the project type designed to assist cooperatives in the solution of specific problems. Unless the specialist is permitted sufficient time to do a thorough piece of work in analyzing the management problem before him, the task should not be undertaken. An inadequate piece of work reflects unfavorably not only upon the specialist but also upon the institution he represents. Furthermore, an incomplete analysis is likely to be of little value to the cooperative.

An extension specialist in agricultural economics is often called upon to attend a large number of meetings and speak on a great variety of subjects. His success is too often measured by the attendance at these meetings and by the number of contacts he makes during the year. Using this yardstick the extension worker who deals with management problems of cooperatives is at a distinct disadvantage if only the directors and officers are considered as having been reached. On the other hand, the specialist has no handicap when his work is measured in terms of the membership of these associations and consideration is given to the fact that any improvement in business operations of a cooperative benefits each one of the hundreds or thousands of members.

More important than any statistical appraisal of results is the stimulus which extension in cooperative business management gives to the development of farm leadership in the business of marketing farm products. Helping directors "learn by doing" this business task carries results which are deep rooted and lasting. This development of the business ability of farmers and the benefits which they derive from more successful cooperatives are outstanding results of this type of extension service.

EDUCATION PRELIMINARY TO COOPERATIVE ORGANIZATION¹

B. B. DERRICK
FEDERAL FARM BOARD

The first essential for a cooperative marketing association is the need for an association. This means that in the given district some definite economic function not now being performed by existing agencies could be accomplished by a cooperative marketing association; or that an economic activity now fulfilled by existing agencies could be more efficiently achieved through co-operation. Cooperatives are succeeding today in a permanent way only where such a condition existed. Some associations have failed because they have attempted to absorb duties which they later found they could not execute for less expense than have existing agencies. Cooperatives have been organized where a real need for a change of the marketing system existed, but there were other conditions which made it unwise to set up a cooperative organization.

I firmly believe that a very high percentage of present-day lack of member support of our cooperative marketing associations is due to the fact that farmers have been organized into cooperative associations without having felt any necessity for such organization rather than having grouped themselves together to meet specific needs. This need should be one that is likely to continue over a period of years rather than one of a temporary nature.

How then can a group of farmers determine for themselves whether or not a real need exists for a cooperative association? The following are some of the questions which should be asked and answered as a preliminary to the organization of an association.

Are local conditions favorable to cooperative selling of farm products?

Can a sufficient volume of business for economical operation be obtained?

Can competent management be secured at a per unit cost within financial reach of the association?

Can adequate working capital be obtained at reasonable interest charge?

Can enough capable leaders be found in the area to manage the affairs of the association?

Provided the above questions are answered in the affirmative, what type of organization set-up will meet the needs of the community?

¹This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 28, 1932.

The first step in developing an interest in the possibilities and limitations of a cooperative marketing association among the prospective membership is to have the leaders call a meeting of all farmers interested in the proposed association. At this meeting representatives of state and county extension services, teachers of vocational agriculture, state departments of agriculture, and representatives of other educational agencies serving the area should be brought into the meeting to advise with the farmers as to the advisability of organizing a cooperative marketing association. These educational agencies may then present available information as to the possibilities of success or failure of the proposed cooperative.

This presentation should be followed by a free and frank discussion by farmers themselves. After all available angles have been presented to the group of farmers and discussed by them, a vote should be taken to ascertain how many of those present are sufficiently interested in the proposed organization to have a committee selected from among them to supervise a detailed study of the area. This committee of from five to seven farmers would be responsible for obtaining all available facts bearing on the probable success or failure of the proposed cooperative association.

Great care should be used in the selection of this farmer committee. They should be capable, honest, earnest leaders with sufficient initiative to obtain the facts bearing on the probable success of the proposed organization to complete the organization, and to become its first board of directors if elected.

This committee should then call to their assistance someone from the agricultural economics department of the state college of agriculture or the state department of markets capable of developing the details of the market survey.

The details of a market survey will, of course, differ for each commodity as well as for each area studied. The following points, however, will in a general way secure the information needed to develop sound thinking among the prospective leaders and their membership, as well as provide the basis for determining the type of organization most likely to succeed under the known conditions.

1. *History of Past Cooperative Efforts in the Proposed Area.*

- (a) What cooperatives now operate in the proposed area?
- (b) How long has each been organized?
- (c) Do the farmers feel these associations have been successful?
- (d) Why do they feel as they do?

- (e) If associations have failed, why?
- (f) What have been the services rendered by past or existing cooperatives?
- (g) How has the per unit cost of handling the product through the cooperatives compared with other agencies?
- (h) What percentage of the farmers now utilize the services of the cooperatives?

2. *General Study of the Area.*

- (a) How large a region can profitably be included?
- (b) Size of farms, other chief products marketed.
- (c) Type of farmers, amount of territory, intelligence and community interests.
- (d) What are the transportation advantages or disadvantages of available locations?
- (e) What are the competing areas? How do they affect prices in this area?
- (f) What are the substitute products competing from standpoint of alternate use?
- (g) What are the price-making factors, e.g., quotation boards, number and types of middlemen? Are these factors controlled inside or outside the area?
- (h) Are prospective members financially able and mentally inclined to become supporting members of a cooperative association?

3. *Existing Marketing Agencies.*

- (a) Approximate volume handled by each.
- (b) Can their facilities be leased or purchased?
- (c) Methods of operation.
 - (1) Services now rendered.
 - (a) Per unit cost for such services.
 - (b) Methods of assembly.
 - (2) Basis, time, and reliability of payment.
- (d) Accessibility of present plants and facilities to probable membership.
- (e) Causes of dissatisfaction with existing marketing agencies.
- (f) How could a cooperative improve on existing services?
- (g) What are the advantages or disadvantages of this region from a production and marketing standpoint?
- (h) What are the characteristics of the product to be marketed, that make it especially adapted to cooperative handling?
 - (1) Does it lend itself to standardization as to quality, market grades, and uniform packaging?
- (i) Disposition of surplus and method of payment for such surplus.
 - (1) Quantity to be disposed of locally.
 - (2) Quantity to be sold in other markets.
 - (3) Quantity to be manufactured.

4. *Marketing Facilities.*

- (a) Transportation to assembling points

{	trucks
{	rail
{	water

- (b) Transportation to markets.
 - (c) What are the sources of local, state and national finances—private or governmental? Are they adequate for all seasons of the year?
 - (d) What character of facilities is needed for new organizations?
 - (1) Type, size, and location of buildings, equipment needed. (Varying for the different commodities.)
 - (e) What kind of power is available, electric, steam, water?
 - (f) Can facilities be leased? Cost and capacity of available space. Do existing buildings have adequate railroad and other transportation service?
 - (g) If new facilities are needed, secure estimated costs.
5. *Type of Cooperative Association Needed.*
Federated vs. centralized.
- (a) Capital stock or non-stock.
 - (1) If capital stock
 - (a) Ascertain amount of fixed capital.
 - (b) Determine amount of operating capital.
 - (c) Designate possible methods of securing necessary funds, e.g., mortgage, bonds, preferred and common stocks. Determine how each can be issued legally.
 - (b) Provide for affiliation with larger cooperative associations should conditions justify.
 - (c) Study state and national legal requirements.
6. *Association Operations.*
- (a) Prepare a detailed operating budget.
 - (b) Estimate detailed budget of fixed costs beyond the control of the association.
 - (c) If side lines are anticipated (a) and (b) should be prepared for each side line.
 - (d) Compile a very careful estimate of anticipated volume.
 - (e) Assemble a very careful classification of the quality and market grade of products as they are now produced.
 - (f) Estimate from (e) the percentage change in production methods necessary to market a standardized product.
 - (g) Collect information as to whether producers are of the permanent or floater type.
 - (h) Estimate prospective volume necessary to pay above operating costs and to establish a reserve fund.
 - (i) Compare (h) and (e) to determine the possible financial success of the association.
7. *Possible Benefits of a Cooperative Association in this Territory.*
- (a) List conservatively the probable advantages.
 - (b) List conservatively the probable disadvantages.
 - (c) Draw conservatively conclusions as result of the study.

After the above information has been secured and analyzed by qualified persons, it should be taken by the state extension economist in marketing or other qualified person and the committee to small group meetings of not more than 50 prospective mem-

bers. At these meetings the major findings should be carefully discussed in such a manner as to give the group as complete a picture as possible of the marketing problems facing it. The possible benefits to be obtained from an association should be carefully explained but never oversold. The prospective member should be given an opportunity to ask questions and to add information to that already collected. If insufficient volume is available to operate economically and in competition with existing agencies, the organization should be dropped. Conditions other than volume may preclude the advisability of perfecting the organization at that time, in which case the prospective members will in all probability vote against going ahead with the organization. However, the committee may find conditions favorable and they will proceed with their organization activities.

With information of this character available to guide the future cooperative association, the membership enter into their organization activities free of prejudices, and with a complete understanding of the problems facing their association. With the above procedure, while admittedly taking more time to get the organization started, there is no excuse for extravagant promises from organizers.

Once the prospective member knows the competition his organization must meet locally and from other areas, in regard to quality, time, and place of marketing, the membership is more likely to follow better production and marketing methods, knowing in advance that the possibilities and limitations for improvement of marketing services are wholly dependent upon the degree of cooperation obtained from the whole membership of the organization.

The next step in the development of the cooperative association is the selection of its membership. Experienced cooperative leaders are now strong in their conviction that no producer should be solicited to become a member of a cooperative marketing association who is financially unable or who lacks the mental inclination to produce and deliver to the association a product capable of meeting specific market demands. The member meeting these requirements will in all probability continue to acquaint himself with the current market problems of his association and for this reason will be a continuous booster for it rather than to continue to blame his organization for conditions of which he has little or no knowledge.

With an appreciation of the foregoing and an understanding of market demands, the management of the association can more

readily convince its membership that the delivery of cull products to the market is for the most part an unnecessary expenditure of money, and that surplus production of perishable products tends to flood the market and thereby break the entire market price.

Seldom is it advisable to solicit every producer to become a member. Each member should be selected not on the basis of an obligation to the community, or commodity, but on the basis of sound thinking, interest in, and ability to cooperate with his fellow producers.

It would seem, therefore, that in soliciting membership, we should get the grower into the line of thought that membership in a cooperative is a privilege and not a penalty.

The following rules may aid the new association (local, state, or national) in establishing a sound operating business unit:

1. Do not antagonize existing trade interests by severe criticism of their past methods of handling farm products. The association should stick only to the marketing goals set by it, quietly developing its own program.

2. Be sure that adequate volume of business has been signed up to insure a low per-unit overhead cost to the members before starting the sales activities of the association.

3. Be certain to secure capable management, with a working knowledge of the commodity handled by the association in order to insure the success of the association.

4. Be sure that the management of the association brings the marketing process, with its problems, under the observation of the producer members so that they can better analyze and understand the various steps in the marketing process. Having acquired an accurate knowledge and a complete understanding of marketing problems, these producer members can intelligently cooperate in making improvements, initiating reforms, and correcting abuses in the marketing process. Thus the producer learns to know consumer demand and to adjust his production methods so as to enable his association to meet the most critical requirements. The more critical the demand the greater is the opportunity of the association membership to develop a quality product, with a brand name, which will tend to eliminate outside competition.

5. Be sure that the members of the new association realize that cooperation has not been found to be a substitute for good management. Sound business methods are as essential to co-operatives as they are to private business enterprise. This means

that the association must start operations with a low per-unit overhead cost and maintain it; that adequate working capital must be furnished by the membership; that complete and understandable records must be maintained; that frequent audits must be made to insure stopping of financial leaks; that provisions must be made for establishing reserve funds; and that all must be administered by a manager who knows the market outlets for his product. In other words, the prospective member should be sold on some of the things a cooperative cannot do before it is too late.

It has been the writer's observation that even though extreme care has been used in pointing out the limitations of cooperative marketing, it is very easy for the membership unconsciously to expect the impossible.

6. Be sure the manager realizes that the member will expect to get the most money possible for his product, and get it as quickly as he can. The successful cooperatives are recognizing this grower psychology. In other words, a successful cooperative must be able to pay the farmer a price comparable with what he can get through any other channel, quality and grade considered.

After the association is organized, I believe it is safe to say that the management of a cooperative association can go no further in shaping or executing policies than it can lead the membership in its thinking and understanding of the association policies. The knowledge and understanding of members are more important factors in cooperative associations than in other types of business enterprise. Whatever may or may not have been the intention of officers of cooperative marketing associations as to the policy of giving out information or planning an educational program for the benefit of the members, the important thing to consider is whether this program or the information given out by the management is understood by the member. The actual knowledge of or what the member thinks about his cooperative marketing association then becomes an important factor in the success or failure of such an organization.

If the cooperative management is to guide the affairs of the association successfully, it should know what its members think about their organization and why they think as they do. In other words, the member must not remain ignorant of the real facts about his association nor can the management long fail to recognize his lack of knowledge of the real facts but must attempt, through education, to build in him an intelligent confidence in the association.

INSTRUCTION IN COTTON CLASSING

A. W. PALMER

BUREAU OF AGRICULTURAL ECONOMICS

Studies of local cotton markets which in recent years have been made in nearly all of the cotton growing states, have quite generally agreed in the conclusion that the premiums which superior qualities of cotton command and the discounts which inferior qualities must take in the central markets are reflected only partially in the prices paid growers. Howell has estimated from a large volume of data, systematically collected over a period of three years throughout the cotton belt, that on the grades above middling, growers who sold in the local markets received about 45 per cent of central market grade premiums and were charged only about 56 per cent of central market grade discounts, while on staples, longer than $\frac{7}{8}$ of an inch, they received only about 16 per cent of the premiums, and were charged only about 7 per cent of the discounts on shorter staples. Lanham by applying the average annual grade differences and staple premiums and discounts of the central markets to the quantities of each grade and staple found in the crop of 1931-32, has arrived at a figure of $25\frac{3}{4}$ million dollars, as the approximate amount of the total premium on the crop over middling $\frac{7}{8}$ " prices, which, as is generally known, are the usual basis of market quotations. Calculations similarly made for the three preceding crops give figures of $20\frac{3}{4}$ millions in 1928-29, $6\frac{1}{2}$ millions in 1929-30, and a little less than 18 millions in 1930-31. Although with middling $\frac{7}{8}$ " cotton selling at between 5c and 6c a pound, these amounts may not be enough in themselves to bring prosperity to cotton growers, it would seem nevertheless, after making due allowance for weaknesses in the calculation that the cotton growers could well afford to absorb the full discounts on cotton of inferior quality, if they could receive the full amount of the premiums and that the stakes are large enough to warrant an effort to realize them.

There has frequently been pointed out another consideration, predicated upon the belief that cotton growers can in some measure control the quality of their production, that until prices paid the growers in local markets reflect more definitely the relative demand for particular grades and staples, growers' incentives to produce will not be in line with market demand insofar as quality is concerned. The problem of finding means of bringing the price scales for the different qualities of cotton in local markets more nearly in line with those in the larger spot mar-

kets is one therefore, which from at least two points of view, deserves a place in the thought of students of cotton marketing.

No difficult assumption is required to say that a first requisite to such a development is that growers should have the means of knowing the qualities of their cotton before it leaves their ownership and the prices at which those qualities are currently selling. It is an unpleasant fact, however, that cotton growers are neither qualified as a rule, to determine the quality of their cotton nor, except the cooperative memberships, provided with facilities through which they may obtain an impartial classing service. It is such considerations, rather than the vocational training aspects which, it is assumed, give to the subject of cotton classing whatever interest it may hold for economists and which make it seem worth while to canvass the possibilities of contributing to improvement of local market practices and conditions through instruction and training in the art.

An examination of these possibilities may be undertaken from several viewpoints. It ought, doubtless, to include some consideration of the subject material, some reference to the methods by which training has been customarily obtained, a brief review of the experience acquired thus far in efforts to teach classing and an appraisal of the objectives which may be set for future endeavors.

In considering the subject matter, it may be recalled, even at the risk of triteness, that considerable variation of qualities is always found in the cotton crop while in manufacture, there must usually be a selection of raw cotton of rather definite quality. On the lower side the quality of cotton which the manufacturer can use is subject to the mechanical limitations of his machines and processes, and is further limited by the quality specifications which must be met in the product. On the upper side, the manufacturer usually encounters economic limitations upon his choice of cotton in the price for the raw material which his manufacturing costs and competition in the sale of his yarn or goods will allow him to pay. The manufacturer may mix or blend different qualities, but in order to control the ultimate quality of the blends, he must mix cottons of known and fairly uniform qualities in fixed proportions. Thus it has become one of the essential services in marketing to select and accumulate in lots, bales of cotton of like quality which can be supplied to manufacturers according to their individual needs. To supply satisfactorily the needs of particular manufacturers is a task of much skill and delicacy. The financial success of many cotton mercantile and

possibly also of some cotton manufacturing enterprises has doubtless been due to the skill with which their classing has been done. A responsible classer, therefore, occupies a position of respect, both in his firm and the market in which he is known. These facts are mentioned because the most of whatever foundation there may be for logically distinguishing and graduating qualities of cotton is derived from the experience of these practitioners of the craft. Scientific investigation, until quite recently, has strangely overlooked the challenge to explain quality of cotton in terms of the fundamental, physical and psychological properties of the fibers; or to find ways of measuring these factors in terms of customary units; or to trace the influence of variations of these factors of raw fiber quality through the processes of spinning, weaving, knitting and finishing, finally, to measure their effect upon either the efficiency of textile machine operation or upon the properties or qualities of yarns and fabrics. A considerable literature exists which deals with manufacturing processes, equipment and operation; but there is little as yet which relates to the raw material with enough directness to be very useful to classers or teachers. Nor has any Taylor or Gilbreath yet appeared to analyze the technic of classing and present it in manual form.

The most tangible material for instruction and cotton classing is the official standards which represent, in form for easy reference and application, fixed scales of grade and staple. From a study of them, a certain concept of quality may be established. The standards are not in the present state of their development, exact indices of spinning quality, but represent rather, a rationalization and unification of the diverse concepts which had confused the use of a common terminology prior to their establishment. The need for a systematic technic or method for applying the standards to enhance the uniformity of the application has been recognized. Work is in progress in the Bureau to this end, but few of the results are sufficiently matured for general release. For the present, therefore, instruction in the classing art must be for the most part, such as the individual instructor can supply, out of his own store of experience and tradition.

It may be well at this point to consider that the instructor's early training has been gained generally by an apprenticeship of a kind, and whatever he may have of professional standing and reputation he will have earned by proving himself, after years of hard application and effort to be a capable "judge of cotton" and valuable to whomever may be prepared to use and pay for the

services he can render. While he will doubtless be faithful in his efforts as an instructor, he is not unlikely to believe inwardly that the only true way to a mastery of the art of classing is the way by which he has come. In this belief he is supported by the beliefs of the markets, which are accustomed to look for their classers to the men of their own training, and which, until the late years in which the standards have been in use, have looked with at least a mild suspicion upon efforts to teach classing by the methods of the schools.

With these suggestions of the pedagogic possibilities and limitations it may be in order to consider some of the experience gained up to this time in cotton classing instruction. According to the best available information, the first course to be given with a definitely agricultural purpose was at Texas A. & M. College in 1918. Its primary object was to train a small group of classers in the use of the official cotton standards in preparation for cotton grading demonstrations in local markets according to an agreement between the Extension service of the state and the Bureau of Markets. This course was repeated in subsequent summers and similar courses were inaugurated the following year in some of the other states. In 1921 courses were offered by the colleges in North Carolina, Tennessee, Mississippi, Louisiana and Oklahoma. These courses were all quite definitely associated with the program of cotton grading demonstrations and received assistance from the Federal Bureau of Markets. The grading demonstrations were discontinued when the state-wide cooperative marketing associations were organized, and equipped with their own classing staffs and interest in cotton classing schools seems to have declined concurrently. In 1922 and 1923 the records show co-operation only with Oklahoma A. & M. College.

The passage of the Cotton Standards Act and the negotiation of international agreements for universal standards in 1923 seems, however, to have revived this interest at the same time that it gave the first real significance and effect to the standards in the spot markets of this country. In 1924 Oklahoma, North Carolina and Clemson Colleges offered courses with federal assistance and from that time onward, the number of summer schools increased somewhat. The courses have been arranged by the colleges usually as a part of their special summer curricula. The Bureau has assisted by assigning specialists in cotton classing to demonstrate the standards and to serve as instructors. Convinced of the desirability of establishing thoroughly the standards in world trade, and preoccupied with the tasks of sup-

plying copies of the standards needed by the world trade, of helping the markets in this country and abroad to adjust their business to these standards, of pursuing researches necessary to the physical development and stability of standards, and of sound principles of quality classification, the Bureau has made no very careful study of the results of this work. There are, however, some data available for the years since 1928, which may be of interest. In 1928, aid was furnished to the Warehouse Division for a course at La Grange, Georgia; to the Louisiana State University for a 4-week course; to Clemson Agricultural College for a 4-week course; to North Carolina State College for a 6-week course; to Texas A. & M. College for a 6-week course, and to Oklahoma A. & M. College for a 4-week course. In 1930 short courses were given by the Warehouse Division at Rome, Georgia; the Staple Cotton Cooperative Association at Greenville, Miss.; Clemson Agricultural College, S.C.; Louisiana State University; North Carolina State College; Georgia School of Technology; Oklahoma A. & M. College and Arkansas Extension Service, in which the Bureau was invited to cooperate but found its personnel required for its own extraordinary duties. In 1931, however, it assisted the Warehouse Division at Rome, Georgia; Clemson Agricultural College; the Tennessee Extension Service; Mid-South Association; Arkansas Extension Service and Oklahoma A. & M. In 1932 it assisted the University of Texas, Clemson Agricultural College, Oklahoma A. & M.; Louisiana Polytechnic Institute; Georgia Cotton Growers Cooperative Association; and the Arkansas Extension Service.

Other courses were given in this period, some by state colleges without assistance of the Bureau, and others by private firms. But, in the summers of 1929, 1931, and 1932, there were enrolled in the short courses which the Bureau assisted a total of 576 students. According to the announcements of the colleges, there seemed to have been no special scholastic pre-requisites to registration. Some impression of the types of students making up the total number may be had from the record of their previous experience and knowledge. Country buyers of cotton comprised the largest group and numbered 141 or 24 per cent. The next largest group reported no experience and numbered 135 or 23 per cent. Business experience of a general nature was reported by 127. although the record is rather vague at this point. Of the remaining 173, 35 had had previous courses in cotton classing; 32 were ginners, 17 were warehousemen, or employed in warehouses; 16 had had office experience in some phase of the cotton industry,

and 8 had been receivers of cotton for cooperative associations. Except for the 23 per cent, who reported no experience, all had had some prior experience or training in one branch or another of the cotton business.

Inquiries as to students' purposes in taking these courses brought out the following replies: 102 said they intended to use the training as local buyers; 73 expected to be receivers for cooperative association; 31 intended to be farmers; 11 wanted college credit for the work done; 7 wanted to use the knowledge as ginners, and in this connection, it should be observed that ginners in considerable numbers have come to be cotton buyers; 2 declared that they wished to improve their training as insurance adjusters; 3 gave replies that could not be classified and 282, or about half of the total number, assigned no purpose, other than that they wanted to learn something about the subject. Out of the whole group, 19 said that they wanted to improve their classing and their knowledge of the standards, so that they might qualify for licenses under either the United States Cotton Standards Act, or the United States Warehouse Act, and secure employment contingent upon obtaining such licenses.

Records of accomplishment in these short courses in the possession of the Bureau unfortunately are rather fragmentary, but of 191 who submitted to tests after the conclusion of the courses, 62 were credited with making a good showing in grade, 103 were rated fair, and 26 poor. In stapling the figures were, 48 good, 82 fair, and 61 poor.

Some assistance in evaluating these results may be had by comparison with the results of examinations given to applicants for licenses to classify cotton under the United States Cotton Standards Act. Three hundred bales covering a wide range of grades and staples comprise the regulation test. Applicants must furnish authenticated evidence of previous responsible classing experience and pay an examination fee of \$10.00. Unless they can show four years or more of good experience, they are not encouraged to take the examination. A rating of 70 per cent is required before approval of the application is granted, but in staple, applicants are given a tolerance of $1/32$ inch. The usual expectancy among these applicants is that on their first attempt, only about three out of ten will pass.

It will be seen that about an equal percentage of summer course students attained a rating of "good" in grade. It may be pertinent, however, to note the comment of some of those who served as instructors that the best progress was made by the students

who had previously had some experience in which they had to deal with quality, such as buying.

A simple observation or two may be made of the student personnel. Students who had a definite purpose in mind, intended to use their training at the point in the marketing system where the grower enters it. Neither growers nor classers from central markets, however, attended in significant numbers. This may not be surprising. Cotton growers, it is believed, are coming to understand classing to be a specialized and technical form of service which can be better performed for them than they can hope to do it for themselves. Classers from the larger markets who were prompt to adjust to the standards as soon as they came into general use in world trade, may have been disposed to feel that they had little to gain from attending these courses. Such an attitude may easily exist until a time when the colleges are prepared to give instructions and training of a distinctively better sort than the large markets themselves can offer. That time may not be here, but on the other hand, it may not be far away. New knowledge of cotton quality of a fundamental sort is now pouring forth from the research laboratories of England, Germany, India and even Russia, which the cotton quality specialist of the future must have. With it is likely to come an opportunity to teach the art of testing for quality and measuring its factors by microscopic, mechanical, chemical and mathematical methods to meet a demand for personnel with this preparation. If and when such a time arrives, the task will presumably belong to college departments which can supply the precision equipment and atmospheric control necessary to the work.

Meantime, it is certain that there are too few persons qualified as classers to pass the cotton crop forward from the growers to the next stage in the marketing process. May it not then be said that teaching in the best light of the times of classing technique and the use of standards deserves to be considered a desirable and worthwhile extension activity?

DISCUSSION BY ASHER HOBSON

UNIVERSITY OF WISCONSIN

The subject under discussion is marketing extension. The assignments with the exception of the paper on "Instruction in Cotton Classing" deal with cooperative marketing only. I shall confine my discussion to the cooperative phases.

In attempting to promote successful cooperative marketing activities, the extension specialist is confronted with widely varying tasks due to

the functions and responsibilities of the various groups directly concerned. The topics presented in the papers read this afternoon furnish a helpful classification of these groups. They are:

1. The membership, actual and potential.
2. The directorate and the management.

From the standpoint of effective extension technique, it seems to me that the membership presents, if not the more important, certainly the most difficult problems. May I reserve my remarks on this point for a moment and pass on to a discussion of acceptable methods in working with directors and managerial staffs. In this connection Professors Bond and Froker stress the advisability of aid through specific analysis of specific problems of a specific association. They recommend concentrated efforts upon a limited and definite objective. Upon this, I am sure that we are all agreed. At the University of Wisconsin the trend of its marketing extension program is toward the making of fact finding analyses which point the way for action. In carrying out such a program, certain fundamentals need be respected.

At the expense of possible repetition I shall mention two of these fundamentals: 1. Analytical studies of internal operations should be made by extension agencies only upon the request of a responsible group within the organization. Otherwise, the findings, no matter how accurate or how sound, are likely to be ignored. 2. The analysis should point to action. But definite decisions, on the part of the extension specialist, involving association policy should be noticeable by their absence. It is his province to present the facts upon which decisions may be based. But the duty and responsibility of making the decisions rests with the directors. The specialist, if he would is not in a position to relieve them of that responsibility. It is well to remember that most decisions of cooperative marketing groups involve financial policy, the success of which depends quite as much upon its execution as upon its soundness. The extension worker has no financial responsibility in the organization or control over the personnel upon whom he must depend to carry out his recommendations. Hence, it seems essential that decision making authority be exercised by those with such responsibility and such control. What I am trying to say is, that the influence of the extension specialist will be greatest when he is armed with a maximum of facts pertaining to the specific problem under consideration, presented with a minimum of preachment.

It is safe to assume that many cooperative associations act without even attempting to secure essential data upon which to base action. Professors Bond and Froker advocate that the facts precede the action. Can the marketing extension worker perform a greater service than that of bringing this to pass? I doubt it.

May I return now to the question of extension methods suitable for use among the rank and file of members of cooperative marketing associations. To be sure the one who makes an analysis of management problems will be called upon frequently to present his findings to the members. This is as it should be, for an uninformed membership is a poor prop to an association in times of stress. But I refer more particularly to the imparting to members, of that information and attitude so lacking and yet so important in avoiding many of the association's prevalent difficulties. At present the extension specialist is generally called

upon to prescribe a cure. What is needed is a service that will result in prevention. Undoubtedly, the membership must have an important part in preventive measures. A knowledge, on the part of members, of the limitations, the possibilities, and the sacrifices inherent in the successful operation of a cooperative is an essential part of the picture.

It is said that the folk schools laid the foundation for the present cooperative structure in Denmark. The Committee on the Cooperative Marketing of Tobacco reporting at these meetings is of the opinion that the widespread failure of tobacco cooperatives during the past decade was due in no small measure to the fact that a majority of those enrolled were not prepared to assume the responsibilities of membership. How is the extension service to prepare the member—actual and prospective—to assume his full share of the obligations of, and contribute his full share of support to, the organization to which he belongs?

Certainly, high pressure campaigns do not point the way out. One may well doubt the effectiveness of the general meeting or lyceum system for the dissemination of general information which cannot well be translated into specific action. Perhaps, cooperative experience, although expensive is the best teacher. Experience furnishes its own laboratory. The spread of the cooperative movement offers increasing opportunity for education by this method. Agricultural high schools, colleges of agriculture, and universities are offering an increasing number of courses in this field. This is a hopeful sign. I do not know of any one solution. I merely bring to your attention what I consider to be one of the most difficult problems in extension technique confronting the marketing specialist today.

DISCUSSION BY H. C. GRANT

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Mr. Derrick's paper is based, I judge, on long experience in the practical field of advising and assisting in the organization of cooperative associations. In his more recent experience in connection with the work of the Farm Board he may have been accused, as I understand the Farm Board has been accused, of being nothing more nor less than a "wet nurse" to newly born cooperative associations. This accusation cannot be applied to Mr. Derrick with respect to the paper which he has just read. In this paper he shows signs of being a well trained obstetrician for he portrays with commendable clarity and brevity methods of prenatal care in connection with cooperative associations and even goes so far as to suggest some measures of birth control.

Mr. Derrick's problem is two-fold: 1st. How can farmers be sure that there is a real need for cooperation? 2nd. How can farmers ascertain the problems and possibilities that lie before the proposed association? These two problems have been well stated, thoroughly analyzed and many suggestive ideas presented, but from my own experience two problems remain unanswered.

1. How are you to educate farmers to the need of determining whether or not a real need exists for a cooperative association? In this connection the following definite situations arise:

Situation No. 1. The impetus of organization gets under way before those capable of advising are asked to assist, or in the event of not being asked, before they become aware of the move to organize.

Situation No. 2. The impetus of organization gets under way and state or university marketing specialists are deliberately ignored for various reasons.

In both these instances the Farm Board, of course, may say, "If you don't take our advice you won't get our financial assistance." But suppose the Farm Board for any reason whatever does not enter into the picture what are you to do? In Manitoba we have tried to face the problem by setting up a cooperative marketing board. The members of the board are appointed by the government and represent the old established cooperatives, the general farmers' organizations and the Department of Agricultural Economics of the University. The Registrar of Cooperative Associations is secretary of the board. The board administers trust funds under general provisions of an Act and without government interference. These funds are used for education and investigation in marketing. The Registrar is the only one who has legal power to intervene in the organization of a cooperative and as he is Secretary of the Board which is interested primarily in safeguarding and promoting sane, practical development, the Board can give the Registrar guidance and financial assistance to help cooperatives obtain the preliminary investigational work which Mr. Derrick has outlined.

The second problem which arises out of Mr. Derrick's paper is:

2. How may be obtained the information demanded in a market survey when the need for an immediate decision precludes the possibility of making the survey?

For instance, a crisis emerges in the milk industry and the producers decide hurriedly and enthusiastically to start a cooperative distributing system. When this situation faced us last winter I was fortunate enough to have the confidence of the producers. The scheme was obviously unsound for many reasons, particularly for technical reasons. The answer to the problem was found in convincing the producers that the wisest thing to do was import the Manager of the Twin City Milk Producers Association for one day and follow his advice. They did not go into the distributing business.

May I make this one comment in closing? I am beginning to conceive of our job as marketing extension specialists or teachers of marketing much in the light of that of practising physicians to the marketing system. The day when our job consisted of writing long descriptions of business set ups which changed before we went to the publisher is done. Likewise, I trust, is finished our job of writing up post-mortems of defunct associations. There is a constantly growing group of economists who are diagnosing and treating the living organism of the cooperative movement. If those of you who are in this work would keep a case book covering your experiences, and from time to time prepare mimeographed summaries for those who may be conceived of as your professional colleagues, it would provide all of us with a broader basis of sound practice and tested theory than we have at present.

THE ECONOMIC BASIS OF MARKET GRADES¹

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Market grades have come to assume a place of much importance in present day interchange of commodities. This is particularly true for agricultural products because of the wide variations in quality which such products show and because these variations are largely due to influences beyond the producer's control. The large number of relatively small producing units found in agriculture and the type of market organization for its products are further reasons for the prevalence of grades for products of the farm. Manufacturers have greater control over the processes involved in producing their products. They determine upon the product by the selection of raw materials and methods. The woolen mill controls the kind of cloth it manufactures through its selection of the grade of wool and the methods employed. The wool grower can influence the quality of wool through his selection of breed of sheep and the care which he bestows upon his flock. Wool from different parts of the animal and from different animals, however, varies in grade and quality. The potato grower can improve upon his potatoes by proper variety and seed selection and treatment, but in spite of his best efforts, the crop will include a large range of sizes. Disease over which he is far from having complete control, produces other quality variations.

The basis of market grades may be approached from two different angles; one, the technical and the other, the economic. Consideration of the basis of market grades has been mainly from the technical aspect, namely that of measuring certain factors which are employed as indicators of grade or quality distinctions. Thus, in the case of wheat grades one is concerned with such factors as weight, moisture content and dockage. Butter is scored on the basis of flavor, body, color, salt and package. Size of the air cell, appearance of the yolk and condition of the shell are appraised as indicators of quality and hence of grade of eggs.

It is not the intent here to set up a classification of the technical and the economic into separate and distinct categories. Technical factors used in grade determination are, or should be, a reflection of economic. No useful purpose is served in attempting to judge the flavor of butter unless flavor affects the demand for

¹ This paper was read at the Twenty-third Annual Meeting of the American Farm Economics Association, Cincinnati, Ohio, December 30, 1932. Published with the approval of the Director as Paper No. 1154 of the Journal Series of the Minnesota Agricultural Experiment Station.

butter. If color has no influence on demand, why be concerned with an attempt to measure it? The problem of defining market grades in reality is one of determining the considerations which are of economic importance in influencing demand and then to find technical factors which are susceptible of measurement as a means of assigning proper weights to each of them. The economic basis of grades is found in factors affecting the utility of goods and hence the demand for them. Grades are concerned with the want-satisfying qualities of products. As one writer² has put it, "The extent to which a grade reflects the relative value of the product depends upon the completeness with which it deals with the various factors influencing price and upon the range of quality permitted in any one grade."

The qualities which influence market preferences are not necessarily those susceptible of exact technical or mechanical measurements. The calorie content of certain foods may be determined but what if this is not the factor which influences consumer demand? It may be easy to determine that consumers in a given city during the winter season are paying a much higher price per unit of food value found in fresh, shipped-in carrots than in locally produced carrots which have been stored. But the consumers who prefer the fresh carrots over the stored are not thinking of the relative values as sustainers of life. Their choice is influenced by other factors such as appearance, taste and palatability. That the consumer may not always appear to exercise the best judgment in his preference is beside the point. The primary purpose in grades is to recognize preferences as they are, not as the developer of grades may think they should be. This, however, is not a denial of the possibility of using established grades as a means of educating consumers in their preferences.

If grades are to measure adequately the factors which result in price differences between different lots of a commodity, they must concern themselves with the factors which affect such differences. These are economic. The problem of measurement, however, is not always an easy one. There are some factors for which measures have not been developed. Some are measured by methods not suitable for use in every day commercial operations of the market and hence are not included in grades. For example, protein content of wheat is not considered in wheat grades but frequently is an important consideration in determining the price for a given lot of wheat. Protein content for a long time was not

²Tenny, Lloyd S., "National Standards for Farm Products," U. S. Department of Agriculture Cir. 8, 1927.

given recognition except as premiums might be paid for wheat from areas averaging high in protein. Methods of determining protein content have been developed but they are not suitable for use by the country elevator operator in deciding upon the grade of grain which farmers offer for sale. In the case of wool, the complexities of grading have resulted in attention being centered primarily on one factor, the diameter of the fiber.

Established practices in the trade sometimes limit the number of factors considered because a limited number have become associated with market grades. Thus, cotton grades are based largely on color and foreign matter. Length of staple, an important consideration, is given separate recognition. The desire for standardization of market grades may have led in some cases to the inclusion of only those technical measures which represent fairly constant differences as far as their price influences are concerned. Some considerations may have a varying importance from season to season or time to time.

While it is necessary for market grades to recognize various quality factors affecting the price of a commodity, it should not be overlooked that this in turn may lead to complications in the use of grades. It may happen that a given lot stands high in ranking for several factors involved in grading but it may be placed in a low grade because it is off in one of the factors. Limitations upon even well-established and well-defined grades may lead to a continued use of purchase and sale by examination or by sample. Transactions in the cash grain markets are illustrative of this.

Grades, in order to be adapted to commercial use, must be of such a nature that they can be applied by dealers and their representatives without too much difficulty. The measurements employed must not involve intricate or time-consuming tests for which dealers are not equipped. Even though he had the necessary technical skill and equipment to make extensive laboratory tests of grain, the country elevator operator could not take time to employ such methods with a line of patrons awaiting an opportunity to unload their grain. Frequently, the farmer wants a definite offer on his grain before it is dumped into the hopper and would not be willing to await the outcome of time-consuming tests to be made at some distant laboratory.

In speaking of factors which supply the basis for market grades, we must avoid leaving the impression that the only ones used are those which lend themselves to exact measurement. This, of course, is not the case. Measurement frequently is a matter of judgment. The senses of taste and smell lead to the butter judge's

decision as to the score a given lot of butter is entitled to because of its flavor. Measurement of this factor has not been reduced to mechanical determination. The scales aid in determining the market grade to which a hog belongs but weight must be supplemented by judgment of type and finish of the animal.

Grades are intended to serve as a reflection of market demands and hence of market value. But the emphasis given to certain factors in market demand is not necessarily constant among different uses at the same time or the same uses at different times. For example, the color of apples is an important consideration for dessert apples. Color has no special significance for cider and vinegar purposes. The finish of a slaughter steer is important while in a feeder conformation of the animal becomes more important. Size and shape in potatoes are more important in the case of bakers than of ordinary table stock. These are suggestive of some of the complicating factors involved in market grades.

Market preferences also may vary between market centers. Some consuming centers show a liking for meat cuts from heavier animals than do others. New York is known as a market showing a preference for white-shelled eggs while Boston has a reputation for preferring brown-shelled eggs. The preference for high-scoring butter is greater in some cities than in others. In fact, there are markets not accustomed to sweet cream butter which tend to prefer butter with a more pronounced flavor. The Boston market is willing to pay a premium for green asparagus, while Springfield about 100 miles distant apparently has no such color preference.³ Such variations add greatly to the difficulties of grade standardization.

We are accustomed to think of market grades as being standardized. That is, that each factor involved in grade determination is assigned a definite and unchanging weight. The argument for this is, of course, that this is necessary in order to get uniformity in grading. If a grade means one thing one season, another thing the next season, there is bound to be more or less confusion. This may be admitted. On the other hand, it may be argued that confusion also arises from the fact that demand is not standardized and uniform. Higher grades may command relatively greater premiums at some times than others.

The more nearly market grades recognize market demands and preferences, the greater the service of market grades in develop-

³ Olsen, Nils A., "The Development of Federal Standards for the Certification of Farm Products in the United States." In *Proceedings of Second International Conference of Agricultural Economists*, p. 683.

ing quality improvement. Plant and animal breeders may employ such grades and their market differentials as guides in determining the characteristics which they should strive for and undesirable features which they should seek to overcome. Farmers may determine variety and breed selection on the same basis. The importance of getting rid of disease and insect damage is definitely indicated. Butter grades and flaws in quality revealed by butter scoring are useful in obtaining the delivery of better quality raw material and the adoption of improved methods of processing and manufacturing.

Likewise, grades which are based on market preferences may serve as guides to consumers in their purchases of certain farm products. It is true, of course, that many farm products lose their grade identity in a manufacturing process. The ultimate consumer does not think in terms of wheat grades but in terms of brands of flour and bread. He does not buy cotton and wool by grade but buys standardized cloth. But in the case of such products as fruits and vegetables, dairy and poultry products, and meats the matter of grade would seem worthy of a more prominent place in consumer buying than it now occupies.

Market grades ordinarily reach their highest development in central markets. Their influences upon the farmer and the consumer depend upon how well they are reflected back to the primary markets in the country and forward to the consumer's market. Thus it is said⁴ "Improvement in classification of cotton in local markets so that dependable, uniform measures of quality may be obtained as to both grade and staple is a fundamental consideration in the problem of paying farmers for cotton in accordance with quality." That this is not being accomplished is indicated by the conclusion⁵ that "Prices paid to farmers for given grades and staple lengths sold in the same town on the same day were characterized by wide ranges indicating serious imperfections in local markets. Prices of the same qualities varied widely from town to town."

Much effort has been put forth to make the consumer "conscious" of this and that sort of a thing. Relatively little has been done, however, in all of this to acquaint consumers with grade differences of the farm products which he purchases. A gradual approach is being made by imposing certain grade requirements on dealers. However, there is place for some consumer education

⁴ Pope, J. D. and Clark, Carl M. "The Relation of Quality of Cotton to Prices Paid to Farmers in Alabama." Alabama Agr. Exp. Sta. Bul. 235, 1931, p. 41.

⁵ *Ibid.*

on this question. Further development of grades suitable for use in the consumer's market should be highly useful for this purpose. The situation with respect to this is well pictured by the Chief of the Federal Bureau of Agricultural Economics in the following language.⁶

"But the all-important element in the standardization program—grades on which individual consumers can buy—in my opinion has been passed over all too lightly. What chance does the housewife with her limited knowledge of the factors affecting quality have before a slab of red meat or a shelf of tin cans covered with colorful and beautifully embossed labels that tell nothing? And yet what guides to quality have we supplied her? A limited number, yes. The stamping of meat cuts, the tagging of turkeys, and the certificate in the pound of butter, constitute a partial response to this demand, but we must go much farther. Until the individual thinks in terms of qualities and buys on the basis of grades that signify quality, there can not be the most sensitive adjustment of price to quality."

The development and use of market grades are of considerable economic importance. For example, market grades may influence market organization. As pointed out by Marshall,⁷ "There are many special causes which may widen or narrow the market of any particular commodity; but nearly all those things for which there is a very wide market are in universal demand, and capable of being easily and exactly described." As market grades are in reality epitomized descriptions, the extent and exactness of grades have an important relation to market organization. Commodities with well established grades may be bought and sold by grade designation without personal inspection by buyers and sellers and without the necessity of their meeting in person. The most extensive market development is found for such commodities as grain and cotton where organized trading in futures is made possible by the existence of grades. The markets for many agricultural products are limited because satisfactory standard grades have not been developed or generally adopted. The nearer grades are actual measures of market preferences, the more likely they are to serve this end. This is another reason why grades should be developed to the fullest possible extent on the basis of the economic factors involved.

Another service of grades closely related to the preceding arises in connection with storage and warehousing. Warehouse receipts with grades sufficiently indicative of the qualities in-

⁶ Olsen, Nils A., In *Proceedings of Second International Conference of Agricultural Economists*, p. 694.

⁷ Marshall, Alfred, *Principles of Economics*, Eighth Edition, p. 326.

fluencing market value may be used in making sale and delivery. Such receipts are used extensively as collateral in obtaining loans. The more nearly grades are indicative of market values, the larger the proportion of such values which may be loaned with safety.

Grades may serve to economize on transportation costs. For one thing, they may be helpful in distributing products more directly to the markets showing particular preference for certain grades are actual measures of market preferences, the more observance of grade specifications avoids payment of transportation and handling charges on unmarketable products. Buyers of some products find that standardized products, running true to certain grade requirements, can be purchased in quantities required without having to buy larger lots out of which selection of the particular goods desired must be made. Grades, therefore, play a part in influencing marketing costs.

Price analysis occupies an important place in agricultural economic research. Price studies must give careful consideration to the representativeness of grades and the prices quoted thereon. Students of price are interested in having the fullest possible detail of information throwing light on problems of supply and demand. Grades enter definitely into this picture. Take wheat supply, for instance. It is not merely total supply but its quality as well, which enter the picture. Lower grades of wheat in reality are more important in the feed grain supply than they are in the flour supply. While we are normally on an export basis for wheat, there are seasons when some grain is imported for mixing with home grown in order to produce the desired quality of flour. Under such circumstances, certain grades of wheat may benefit to some extent from tariff protection although wheat, as a whole, finds its price dependent upon world levels.

The following quotation from the report^a of a study of corn prices is suggestive of the importance of adequate grades in price studies:

"The general quality of the crop is an indication of the proportion that will be of the better grades, as No. 2 and No. 3. Since our price is for a particular grade, the price is influenced by the supply of that grade as well as by the total supply of corn. When the crop is of high quality a large proportion is generally of No. 3 and, in consequence, the price of No. 3 is somewhat lower than it would be if other things had been the same but the crop of lower quality. A 5 per cent increase in the quality has about the same effect as a 1.5 per cent increase in the total supply."

^a Cox, R. W., "Factors Influencing Corn Prices." Minnesota Experiment Station Technical Bulletin 81, 1931.

In short, consideration may have to be given to quality as well as quantity in connection with supply and grade information is essential for this purpose. Our records of quantity are more adequate than those of quality. As one writer⁹ expresses it "Considering the fact that both the scientific and the practical worlds have given general recognition to the influence of quality on the value and price of cotton, it seems queer indeed that we should have kept such excellent records of the number of bales produced and carried over from year to year but no corresponding records of the qualities of the different bales."

Students of agricultural prices are concerned with the representativeness of market prices and price quotations which they employ in their analyses. Market quotations for a grade can not be given in a narrow range if that grade covers a wide range of quality. Where quotations have to be given in ranges, a reduction to a single figure for use in statistical analyses may fail to give the proper figure. Perhaps practically all of the interchange on any given day was at the lower or upper limit of the range. If an average is used, the result is an over or under statement of the actual price. With a narrow range, the error may be immaterial but with a wide range it may be considerable.

Market grades which are not based on all factors of economic importance may lead to price quotations not fully representative of actual prices paid. Thus, in years when considerable premiums are paid for high protein wheat the prices paid for such wheat may be materially higher than quoted grade prices.

Where storage stocks constitute an important element in the supply situation, there may be conditions under which it is essential for the formulation of a satisfactory judgment to have information on the grades of which these stocks consist. An illustration of this arose some years ago during the hey day of tobacco co-operatives. The price policies followed by some of these organizations tended towards overexpansion of acreage. The consequence of this was a steady increase in the total holdings reported in storage. At that time the required reports of tobacco holdings provided only for totals by types and not by grades. Among those who desired to discount the importance of the large stocks were some who suggested that these stocks probably consisted in considerable measure of low grades of leaf unfit for manufacturing purposes. While support for this assumption was lacking, the absence of grade information with respect to stocks on hand

⁹ Youngblood, B., "Relation of Quality to Price of Cotton." JOURNAL OF FARM ECONOMICS, October, 1929, p. 534.

meant that disproof of the assertion likewise was lacking. Anyone attempting to employ statistical analysis as a guide for the determination of correct price policies would find this limitation upon his material a matter of considerable importance.

Considerations of demand in economic theory imply perfect interchangeability of units of a good. For well standardized manufactured commodities such an assumption is not a great deviation from the situation encountered in real life.¹⁰ For many agricultural products, however, the range in quality is considerable and changes in consumer demand may not be uniform for all grades. Stated in other words, there may be different demand schedules for different grades of a product. Why is the spread between the highest quality and lower grades greater at some times than others? What influences cause the consumer to shift from one grade or quality to another? Are lower grades affected differently by substitute products than the higher grades? To what extent do comparative prices guide consumers in their selections? Do they compare prices and weigh relative values of different grades or do they judge quality by price? There is room for additional research on such points. Market grades would play an important part in such studies and the results would be of value in judging the efficiency of existing grades and in suggesting desirable modifications. It may be readily admitted that the fact that consumers frequently are not rational in their decisions is a limitation which is encountered in this field. Mr. Nystrom¹¹ is credited with having made the observation that "Mrs. Consumer does not know what she wants but she will not be satisfied until she gets it." The irrationality of the consumer itself may be well worth studying in connection with determining upon the economic basis of market grades. A desirable development would seem to be that of establishing closer contact between our research workers in the field of agricultural prices and consumption economics and those concerned with the development and enforcement of market grades.

Economic considerations, as already suggested, are the real basis of market grades. Such factors as weight, color, blemishes, admixtures and the like are employed merely because they are indications or measures of market demands or preferences. It is

¹⁰ It should be noted that there is frequent lack of standardization between products of a similar nature made by different manufacturers. The comparison here made has reference primarily to the output of a given manufacturer.

¹¹ Waugh, F. V., "Value of Marketing Research to the Consumer." In 1931 Proceedings of the National Association of Marketing Officials, p. 24.

important that we do not mistake the means for the end and become so engrossed in the measures that we lose sight of that which we are trying to measure. It would seem likely that there is room for further studies of market preferences and demands designed particularly to furnish guidance in the development of market grades. Practical and serviceable market grades must recognize their economic basis, the technical problems of measurement, and their adaptability to usage in trade. A combination of economic and technical research and practical application is necessary.

DISCUSSION BY H. E. ERDMAN

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The economic bases of grading farm products are mainly two. First is the fact that a given product is used for a variety of purposes and in a variety of ways for which the numerous quality combinations have different degrees of suitability. Thus potatoes are used for baking, boiling peeled, boiling in the skins, German fry, French fry, salad, potato chips and for such manufacturing purposes as the production of alcohol and starch. Among the various quality combinations found in potatoes some are more desirable for specified uses than others.

The second basis of grading is the fact that there are differences in custom, practice, taste, or consumer whim which lead to variations in the subjective valuation of the different qualities or quality combinations. The fact that a given group of persons frequently by habit or custom use a menu including baked potatoes means that these persons are likely to value potatoes suitable for that purpose more highly than those not suitable and to pay a premium for them if necessary to get them. There are numerous cases in which a population group associates a given exterior characteristic with a particular quality combination which it values. Thus there are persons—a substantial percentage in some areas—who favor a pink skinned potato over one with a white skin. Likewise there are persons—again substantial percentages in given areas—who favor white-shelled eggs over brown-shelled. These facts lead to "preferences" and in turn to higher valuations for those particular qualities.

In some of these cases no grading problem is involved because adaptation of certain varieties to certain regions has segregated them when production was undertaken, as in the production of certain varieties of apples or potatoes. In other cases a degree of standardization in varieties has eliminated the need for sorting as to certain qualities—white eggs for example. But no amount of standardization in production can eliminate substantial variation in such qualities as size of egg, strength of shell, or certain interior defects in an occasional egg; or such qualities as size of potato, shape, and occasional defects. Grading at point of production permits classification of goods so as to meet varying demands most directly. Since, however, it is costly to grade, there will be variations in the degree of perfection to which grading will be carried. In other words we will economize in the practice of grading.

One way to economize is not to grade all goods as closely as some need to be graded. It is not necessary to grade all eggs as closely as is desired by a certain few manufacturers or particular consumers. It may pay better to do some re-sorting at certain market stages to get the particular qualities these buyers want than to carry grading of the whole too far.

There is an economic basis underlying the failure to grade closely most produce grown for local consumption. In the first place it is all consumed locally, hence there can be no error in hauling it all to this particular market rather than to some other. In the second place the buyer may have reasons for wanting to do his own grading. He may, for example, prefer to do the grading with odd-time labor which would otherwise not be fully utilized. In the third place the buyer of locally grown produce may prefer to buy it ungraded because he finds that he can thus bargain more advantageously with the producer and later with the consumer sometimes by grading deceptively, but quite as often by grading so as more exactly to meet the preferences of his particular customers.

The way in which marketing practices come up for consideration in the establishment of workable grades may be illustrated by an experience of an eastern fruit marketing association. The manager had observed the advantage of close sizing of western apples. He decided to apply the same idea to his barreled stock. He soon found, however, that retailers preferred less closely sized apples when they bought by the barrel so they could satisfy a greater variety of consumer demand from the same barrel. Close sizing compelled them to carry too large a stock of apples if they were to meet the demand for several sizes and varieties.

Consumers vary widely in the degree of insistence upon having the particular quality which is best for a particular purpose. Such variations arise out of a number of factors. Perhaps most important is the fact that consumers have inadequate time to study in detail the qualities of each of the many articles they use daily. In the second place there are many uses for which wide ranges of quality combination are equally satisfactory or so nearly so that judgment is difficult. In the third place many persons lack the energy necessary for the thought and action necessary even to realize that one set of results is more satisfactory than another.

The result is that in the main there is insistence upon a particular quality only when a given item has been singled out for particular attention. Health food fads are a good illustration of this point.

Simplification and standardization in the establishment of grades might do much to increase the insistence upon particular qualities by making it easy for consumers to learn how to ask for the things she wants. Suppose we assume that eggs might be grouped in three size classes—large, medium, and small; in three color classes—brown, white, and mixed; and three quality groups—good, medium, poor; here we would have the basis for 27 grades. Each combination might be called by a name—"Extras," for example, might be one. We do not quite go to the extreme, but in the case of many products do go far enough so that we might greatly simplify matters for the consumer.

Professor Jesness might well have carried further his suggestion that there are really separate demand schedules for the different quality combinations. Much of the discussion of market grades and market differentials not only assumes that market differentials are established by quality

variations alone, but that such differentials are relatively fixed. A shifting of the demand schedules may actually lead to a complete change in differentials. A far-fetched example would be that of a premium on rotten tomatoes in a college town during the run of a particularly bad show.

There are also supply schedules for the separate quality combinations. Note for example the common observation that an adequate premium for a particular quality will presently lead to an increase in its supply relative to the whole and so to a decrease in the premium.

Research on grades should be a combination of the technical sort which seeks to isolate the qualities which make products more or less suitable for given purposes, and of the sort which seeks to locate and evaluate the indicators for which consumers are willing to pay premiums or on which they demand discounts on the open market. The work of Waugh on asparagus is an approach of the latter sort.

OUTLOOK FOR COOPERATIVE MARKETING OF TOBACCO

(Editor's note: A committee consisting of H. B. Price, chairman, William Collins, I. G. Davis, J. A. Dickey, Mordecai Ezekiel, C. E. Brehm, John Hutcheson, L. G. Foster, and Asher Hobson prepared an extensive report on this subject which was presented at the Twenty-third Annual Meeting of the American Farm Economic Association at Cincinnati, Ohio, December, 1932. Lack of space prevents publication of the entire report in the JOURNAL. The following conclusions arrived at by the committee in its report, however, summarize some of the major points in the report.)

Conclusions

First. Cooperative associations have generally been more successful in dealing with physical supply than with selling, notwithstanding the major emphasis that has been given to selling by most cooperatives marketing tobacco. Large-scale marketing designed to match centralized buying appears to be a worthy goal for cooperative tobacco marketing. The difficulty with it has been (1) that such large organizations are unwieldy and not easily adapted to varied conditions, and (2) that in order to realize fully the advantages of collective bargaining they have generally adopted a holding policy. The result frequently has been (1) misunderstanding between the management and members, and (2) delayed sales with consequent slow settlement with growers, lower prices for members than non-members particularly in periods of increasing supplies and declining prices, and unsaleable supplies eventually so large as to destroy the usefulness of cooperative marketing. Considerable progress has been made in pooling arrangements, methods of settlement and otherwise adapting cooperative organization to the needs of growers but the fundamental problem of mass selling to meet the monopoly position of large buyers is still unsolved. Collective bargaining as the major objective of cooperative tobacco marketing accordingly has failed. And there is no reason to believe that it will succeed until tobacco growers become much more experienced in cooperation and have a better understanding of the problems, possibilities and limitations of mass selling.

This means, in our opinion, that cooperative organization of the immediate future should be planned so as to provide tobacco growers with experience in cooperation, to create an understanding of cooperative methods and to do those things in which cooperative effort has been most successful or which reason dictates as offering the best opportunities for success. Relatively small organizations emphasizing improved marketing service and economy in marketing and in which there is opportunity for growers to become thoroughly and intimately familiar with cooperation, appear to offer the best assurance of attaining these ideals.

Organization and operation of cooperatives can not be expected to follow any given pattern under these circumstances because of the great variety of conditions to which they must be adapted. The size of cooperative organization will vary with density of production, condition of roads, opportunities for saving and other circumstances. Generally speaking, they will be relatively large locals. A heavy production and improved rural transportation favor the development of relatively large assembly. At the present time there is a tendency for large tobacco markets and these of moderate size (from 10 million to 15 million pounds) to become larger and the small markets to become smaller. Cooperative organization may take advantage of these developments to effect more efficient marketing.

There may also be diversity of plans for selling tobacco to suit the needs of various groups of farmers. Barn selling; auction selling, both on an individual crop or a seasonal basis; and seasonal pools sold by private treaty with buyers are the chief methods of sale at the present time. Experience and observation have not demonstrated that any one method is superior to the others under all conditions. Indeed, there is reason to believe that a combination of these methods may be the best policy under circumstances where growers are accustomed to different methods of sale when selling privately or where the needs of farmers may call for optional methods of disposal. Federating local associations for selling may also be encouraged if the objective is economy and efficiency in selling, and particularly where locals are marketing tobacco of the same type and having similar trade outlets. Such federations are of doubtful value for obtaining better prices, except as they can effect economies or develop new market outlets, or as there is a wholesale federating. The position of tobacco growers in collective bargaining is similar to that of dairymen whose experience in cooperative marketing shows that a middle ground position can not be permanently effective. However, in view of the difficulties of mass selling of tobacco the advisability of federating locals on a large scale for collective bargaining is questioned until farmers are well disciplined by experience in local associations.

Second. Reference has been made repeatedly in this report to the lack of experience of many tobacco growers with cooperative marketing and to the unfortunate experience of many others. Many growers are monopoly minded and yet a successful plan for mass selling has not been found. Others are discouraged by the seemingly small economies and improvements in services

attributable to small associations. These conditions among the personnel certainly offer a challenge to the leaders of a cooperative movement.

Cooperative associations, agricultural extension services and other educational agencies have given some consideration to educational work but the scope of their work has been too limited to affect the understanding of many farmers of the principles and problems of cooperation. One of the difficulties has been the apathy among farmers themselves for information on the tobacco enterprise except in times when the flame of discontent has burned sufficiently bright to cause them to consider cooperative organization as a solution of their problems. Extension services accordingly have confined their efforts largely to periods when cooperatives were being organized and have been obliged under these circumstances to engage in highly superficial rather than in serious educational programs. Cooperative associations generally have not undertaken this work until it was too late and its effectiveness has often been neutralized by combining it with a legal department or using it to justify present policies. In view of these circumstances, we are forced to the conclusion that what the educational work needs first is an effective technique for adult education in cooperative marketing and then to organize for more continuous and systematic instruction.

Third. Much better information than is now available is needed for such an educational program. The gaps in this report and the inconclusive analysis at many points are striking proof of this fact. What are the elements of strength and weakness in the present tobacco marketing organization? What are farmers' real interests in marketing and cooperation? What is the nature of the demand for tobacco products, buyers' practices, and farmers' response to price? These questions and many others vital to the formulation of organization and cooperative selling plans await satisfactory and final answers for want of adequate information. A comprehensive research program, in which cooperatives and public research agencies may each have a part, would contribute much to supplying this important need.

NOTES

VERTICAL AND HORIZONTAL SHIFTS IN DEMAND CURVES¹

A few years ago, in a note in this Journal,² I made a distinction between vertical and horizontal shifts in the position of the demand curve. The validity of this distinction has recently been questioned in a note by Thomsen.³ I am glad to have the matter drawn to my attention, because the usefulness of the distinction has become more evident to me with the passage of time since my original note was written. The concept of vertical and horizontal shifts in the demand curve deserves a fuller exposition than it has had in the past. The present note will attempt to provide this fuller treatment.

What is Demand?

Let us first be clear as to just what demand is. F. M. Taylor gives us perhaps the fullest and most closely reasoned definition of demand available. He says:

"By the demand for any commodity, the economist means in general the *quantity of that commodity which buyers stand ready to take at some specific price*. In this definition let us emphasize, first, the point that demand is the amount which buyers stand ready to take—offer to take. That is demand must not be confused with (1) the amount men *want* on the one hand, nor (2) the amount men *actually buy* on the other."⁴ Demand is the series of amounts at certain prices that consumers stand ready to take, offer to take, or would take, regardless of whether those prices and quantities have been realized in actual life; that is, regardless of whether that part of the demand curve has been traversed by the supply curve. A man may have a demand for one automobile at \$500.00. When the supply curve moves over far enough to "uncover" this demand, he buys. But his demand existed before the supply curve shifted over and revealed it. At the present time, he may have a demand for three automobiles at \$200.00 each. No sales take place at that figure, because automobiles cannot yet be made as cheaply as that; but his demand is there just the same. Automobile manufacturers may be definitely planning to meet that demand; it is a very real thing to them.

Concave Demand Curves

We are now ready to begin with the fundamental price and quantity data which a demand curve represents. A typical schedule of such data is shown in table 1, section A.

The demand curve D based on these figures is shown in figure 1. Both the vertical and horizontal scales in the chart are logarithmic. This preserves parallelism in the curves throughout the various shifts in their position that are considered. The reasoning, however, is independent of the kind of scales used. Later in this article arithmetic scales are used.

The use of a curved demand line on a logarithmic scale will help to

¹ I am indebted to Mr. D. A. FitzGerald of the Iowa Agricultural Experiment Station for constructive criticisms.

² Supply and Production, Demand and Consumption, JOURNAL OF FARM ECONOMICS, Vol. XIII, No. 4, October, 1931, pp. 639-643.

³ F. L. Thomsen, "Vertical" and "Horizontal" Shifts of Demand, JOURNAL OF FARM ECONOMICS, Vol. XV, No. 3, July, 1933, pp. 566-570.

⁴ Taylor, F. M. Principles of Economics, Ronald Press, 1923, p. 253. On page 254, Taylor develops this definition further, distinguishing "realized demand" from "potential demand."

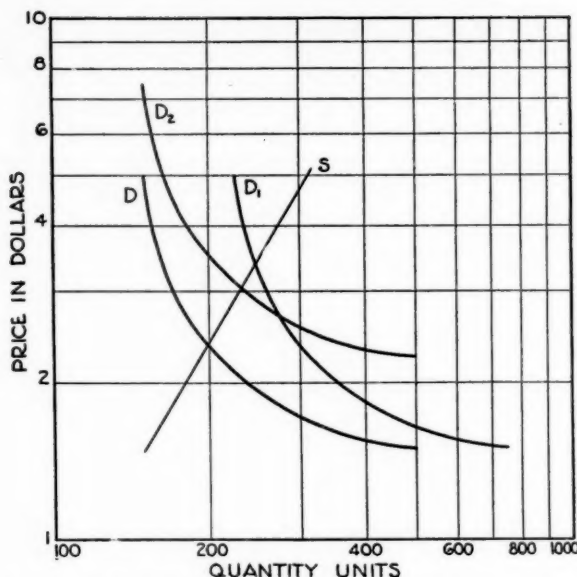


FIGURE 1.—Vertical and Horizontal Shifts in a Concave Demand Curve

TABLE 1.—DEMAND SCHEDULES

A. Original Demand Schedule		B. Population Increased 50% Purchasing Power Unchanged		C. Purchasing Power Increased 50% Population Unchanged	
Price	Quantity Units	Price	Quantity Units	Price	Quantity Units
\$5.00	150	\$5.00	225	\$7.50	150
4.00	155	4.00	232	6.00	155
3.00	170	3.00	255	4.50	170
2.50	190	2.50	285	3.75	190
2.35	200	2.35	300	3.52	200
2.00	235	2.00	352	3.00	235
1.90	250	1.90	375	2.85	250
1.70	300	1.70	450	2.55	300
1.55	400	1.55	600	2.32	400
1.50	500	1.50	750	2.25	500

bring out the point at issue more clearly than the use of a straight line, though the reasoning in both cases is the same.⁵ Either a concave or a convex curve may be used. We will start with the former.

Suppose now that twenty years elapse and the population consuming the good in question increases 50 per cent. If no changes have taken place in the demand per consumer, 50 per cent more goods could now be sold at each price, than formerly.⁶ The new situation is represented in Table 1, section B, in which each quantity figure is 50 per cent higher than the

⁵ The majority of demand curves are concave in the arithmetic-scale charts in which they are usually presented, and would be concave on logarithmic-scale charts also. See for instance, H. Working's pioneer study, "The Statistical Determination of Demand Curves," *Quarterly Journal of Economics*, Vol. 39, (1924-25), pp. 503-543; the great number of curves in Warren and Pearson's Cornell University Bulletin 466, "Interrelationships of Supply and Price," 1928 (note the curve for cabbages on page 34); and H. B. Boyd's Storrs Agricultural Experiment Station Bulletin 180, "Factors Affecting the Prices and Acreages of Cigar Tobacco in the United States," (note the curve on page 246).

⁶ I am using an increase in the population merely as a simple illustration of a shift to the right in the position of the demand curve.

corresponding figure in the left hand section. The price figures remain unchanged. The new curve D_1 , is shown in figure 1.

Now let us suppose that instead of the population increasing 50 per cent, it had remained unchanged, but the purchasing power of each consumer had increased 50 per cent, no other change in demand having taken place. Consumers then would pay 50 per cent more for each quantity than formerly. This situation is shown in table 1, section C, where each price figure is 50 per cent higher than the corresponding figure in section A, the quantity figures remaining unchanged. The new curve D_2 , is shown in figure 1.

The curve D_1 is an illustration of a horizontal shift in the position of the demand curve. The other curve, D_2 , is an illustration of an equal vertical shift. The difference between the two curves seems obvious.

Effect Upon Price Paid and Quantity Taken

The effect of these shifts in demand upon price paid and quantity taken, that is, the effect upon the location of the intersection point of the supply and demand curve, will depend upon the supply curve. As I said in my original note, and as Thomsen agrees: "Whether a shift in the location of a demand curve, either upwards or to the right, will result in an increase in the price or in the quantity taken, or both, depends upon the conditions of supply; that is, upon the slope of the supply curve and changes in its location.

"Under conditions of constant costs, for example, a vertical rise in the demand curve would result in an increase, not in the price for the same quantity of corn, but in the quantity taken at the same price. Conversely, with a fixed stock of a good, a horizontal shift to the right in the demand curve would result not in an increase in quantity taken at the same price, but in an increased price paid for the same quantity. The nature of the supply curve, and shifts that may have taken place in its location, determines the proportion in which an increase in demand, either upward or to the right, is expressed as an increase in the price or in the quantity taken."

The difference between the effect upon price of a vertical and of a horizontal shift in the demand curve when the supply curve is somewhat inelastic is shown in figure 1. If the supply curve were elastic, opposite differences would result. And whatever the slope of the supply curve, if any shift took place in its position, further differences in the effect upon price of a vertical and of a horizontal shift in demand would result.

It is evident, therefore, that whenever the demand curve is convex or concave the demand curve as a whole is entirely different in its position after a vertical and after a horizontal shift; in addition, the effect of a vertical shift in demand upon price paid and quantity taken is different from the effect of a horizontal shift, unless the supply curve has a slope of +1, and remains stationary.⁷

⁷ The substance of this section, set forth about one-half as fully, was part of my original Journal note. It was finally cut out because of the pressure for space and replaced by the last sentence in the first paragraph at the top of page 640 in that note. Subsequently it was condensed and published as Appendix III of Iowa Experiment Station Research Bulletin 140, "The Secular Movement of Corn Prices," 1931.

Straight-Line Demand Curves

We come now to the consideration of straight-line demand curves.

Before beginning, we must decide whether we mean straight line curves on arithmetic paper or on double logarithmic paper. Practically all the statistical price-quantity curves published in recent articles and bulletins are drawn on arithmetic paper. But the present article deals mainly with percentage (i.e., proportional) changes in demand; as already pointed out, if these are plotted on logarithmic paper, the parallelism of the curves is preserved and the exposition somewhat simplified. Perhaps the best plan here is to consider separately both arithmetic and logarithmic straight-line demand curves.

Arithmetic Scales

Let us first consider straight line curves on an arithmetic scale.

In this case the difference between the curves resulting from a horizontal and from a vertical shift is evident, not only when elastic and inelastic curves are used but also when an intermediate curve with slope of -1 is used. This is shown in figure 2. Thomsen's chart should have been drawn similar to this chart. His demand curves remain parallel on arithmetic paper. This seems to be an error, since (other things being equal) if the population trebled and took three units at \$6.00 (where formerly it took one unit, as is indicated by the shift from A to C in his chart) it would also take 18 units at \$1.00—not 8 units as his chart indicates—where formerly it took 6 units.

Logarithmic Scales

If elastic or inelastic straight line curves on logarithmic scales are used, the position of the curve after a 50 per cent upward shift will be different

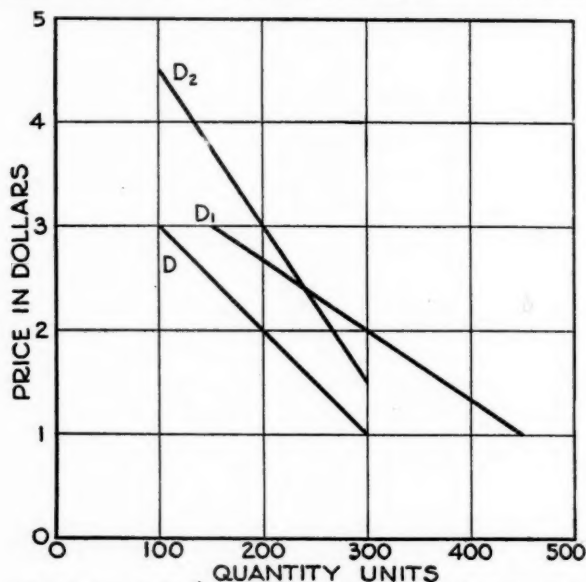


FIGURE 2.—Vertical and Horizontal Shifts in a Straight-Line Demand Curve
Arithmetic Scales

from its position after a 50 per cent shift to the right and so will the price paid and quantity taken.

It is only in the rare case that Thomsen intended to represent—a straight line demand curve on a double logarithmic scale, with a slope of -1 throughout—that the position of the curve would be the same after either shift. The effect of a horizontal shift in demand upon the location of the intersection point would therefore be identical with that of an equal vertical shift. There is no disagreement on that question. After population has increased 50 per cent, consumers as a group might either pay higher prices for the same quantity as before, or take larger quantities at the same price as before, according to the nature of the supply curve. If the supply curve is a vertical straight line (fixed stock) the consumers will pay more for the same quantity. They will pay the price represented by P_1 in figure 3. If the supply curve is a horizontal line (constant costs) they will take a larger quantity at the same price, represented by P_2 in figure 3. If the supply curve has a slope intermediate between vertical and horizontal, the effect on price and quantity will be intermediate—both price and quantity will increase, in proportions definitely determined by the slope of the supply curve. This point was dealt with at some length in my original note.

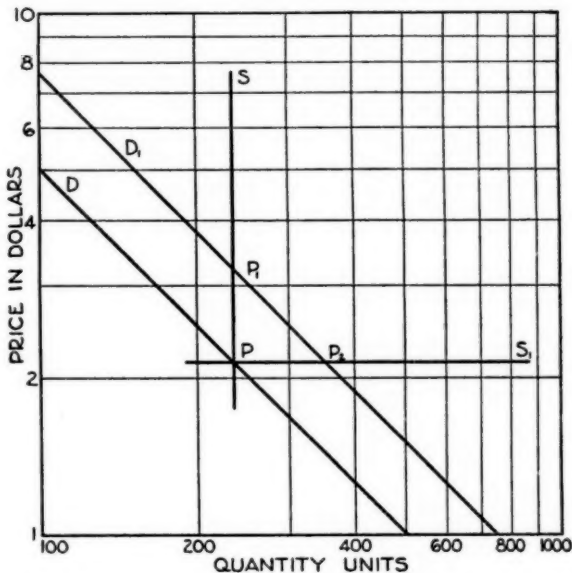


FIGURE 3.—Effect of a Vertical and of a Horizontal Supply Curve

Does the Whole Curve Shift?

The question at issue, however, is not what the effect is on price and quantity, nor what is the nature of the supply curve. Here we are talking about the demand curve, the curve that shows the amounts that consumers stand ready to take or offer to take at different prices. The point is that demand has increased; the demand curve has shifted; and the question is, which way has it shifted—up, down, or sideways? We can answer

that question by asking another—how did the curve get from where it was to where it is now?

We cannot answer this question by observing whether the intersection point or the range of actual price-experience on the demand curve has shifted up or sideways. That, as pointed out above, depends on the nature of the supply curve. We can answer the question only by remembering what a demand curve represents. As we said earlier, the generally accepted view, made explicit by Taylor and concurred in by Thomsen, is that it represents willingness to buy certain quantities at certain prices; and that willingness exists whether the supply curve has fluctuated enough to reveal it in actual transactions or not. This means that the demand curve extends both ways, beyond the range of past experience in the market—ultimately, until it cuts the vertical and horizontal axes where quantity and price respectively are zero. The curve will not extend indefinitely; it will cut both axes at some finite points.⁸

We can tell which way the demand curve has shifted, then, by going back to the original price and quantity data on which the demand curve rests. With the demand curve clearly visualized, it seems to me to be obvious that if population increased 50 per cent—if the quantity figures in the demand schedule each increased 50 per cent—the curve moved to the right, not upwards and to the right. This is perfectly clear when a curved demand line is used, for example, a convex curve that cuts both axes at almost right angles, or a sloping straight line that flattens out or gets steeper as either axis is approached; it is equally true, only less obvious, when a straight line is used. I think we will get farther in carrying our explanation of price movements down to its ultimate causes if we recognize that fact and settle what happened to the demand curve first, and then turn to a study of what happened to the supply curve, rather than say from the first, "We can't tell whether the demand curve moved upward or to the right until we see what the supply curve did." This latter view leads into a blind alley, because it is false; movements in demand curves and supply curves are independent of one another.

We are not studying movements in the intersection points of demand and supply curves; if we were, we would be studying only movements in production and prices; what we are trying to do is to study the movement of demand and supply curves that lie behind and cause these movements in prices and production. Economic theory has provided the research worker with conceptual tools for analyzing movements in prices and production into changes in demand and supply (curves). It seems to me that we are ready now to take the next step and ask, "*What caused these movements in the demand and supply curves?* Did population change, or did purchasing power per consumer increase, or did something else happen, or did several changes take place at once?" We are now for the first time gathering data concerning pay rolls, wage rate indexes, general price levels, etc., which, added to our data on population, exports, production,

⁸ Usually these points, like those shown in fig. 3, will represent prices or quantities not greatly (say 100 per cent) in excess of the highest prices or quantities that have been actually experienced in the market, unless the demand is extremely inelastic, as for salt or water, or extremely elastic, as for human foods that can be fed to livestock if produced in excess. Substitution of other products "levels off" most demand curves as they approach the vertical axis, and rapidly declining marginal utility with increasing quantity causes most demand curves to cut the horizontal axis at a point not very far out to the right.

etc., will enable us to carry our economic analysis this one step farther and give these questions a quantitative answer.*

Application of Concept

The prime usefulness of the distinction between vertical and horizontal shifts in demand curves seems to me to be this: it directs attention straight to the two fundamental factors upon which the demand curve rests, i.e., (1) the number of consumers and the amount that each will consume at particular prices and (2) the marginal utility of the goods to consumers, measured in dollars and cents. These two factors respectively determine the figures in the quantity column and in the price column of the demand schedule, and therefore respectively determine the horizontal and vertical position of the demand curve. Changes in either one of these two factors will cause demand to change, and it is surely worth while to carry our investigation one step farther in an attempt to discover which factor has changed. We analyze price movements into the changes in supply and demand (curves) that caused them, thereby unlocking the door to the major part of economic theory. It is taking only another step in the same direction to analyze the movement of these curves into *their* component parts in the search for the causes of their movements, thereby perhaps extending the bounds of economic theory a little wider.

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THE CALIFORNIA AGRICULTURAL PRORATE ACT

The California Agricultural Prorate Act is a crystallization of majority feeling toward the unruly minority who break down programs designed to give a degree of economic security to an industry.

Several groups of California producers and handlers have attempted to restrict the quantity of products marketed in years of low consumer purchasing power or in years of large crops or both. These attempts have demonstrated clearly that returns to producers can be increased and disaster avoided by such action. However, most of these attempts have met with the difficulty of maintaining participation by a sufficiently large proportion of growers and handlers to make them effective because those growers and handlers who do not participate obtain all of the benefits of such action without sharing any of the burdens.

The foregoing situation may seem peculiar to those not thoroughly familiar with the conditions of production and marketing of numerous California crops. A word of explanation may aid in its understanding.

California produces a number of crops which are grown almost exclusively in that state. The demand for many of them is highly inelastic. A large portion moves to distant markets on consignment. In years of large crops or low consumer purchasing power or both, growers, frequently find themselves indebted to transportation and marketing agencies if all of a particular crop is harvested or marketed. In other words, the products sell for less than transportation and marketing expenses. Such a situation

* An interesting and fruitful application of the concept of vertical and horizontal shifts in demand curves is given in Chamberlin's stimulating book, "The Theory of Monopolistic Competition," pp. 84, 88, 92, etc., Harvard University Press, 1933.

from any point of view is undesirable, and the California Prorate Act aims to correct it.

Briefly, the act provides that when those who produce and market two-thirds of the production of any agricultural commodity desire to prorate their marketings, all of the producers of such a commodity must prorate their marketings.

The machinery for such action consists of a Prorate Commission composed of nine members. Four of the members are producers of agricultural commodities, one member is an experienced commercial handler of agricultural commodities, another a cooperative marketing handler, two are neither producers nor handlers but represent consumers, and one represents consumers of agricultural commodities for processing purposes.

The procedure to institute a program of proration is one of making petition to the Prorate Commission requesting the institution of such a program. Such application may request the Commission to call an election to determine whether or not two-thirds of the producers desire a program of proration or the petition may state that it is signed by two-thirds of the producers representing two-thirds of the producing units. It is contemplated by the sponsors of the act that most applications will come before the Commission in the latter form to avoid the expense and delay of an election.

Upon presentation of a petition for a proration program the Commission must hold a hearing to determine:

- (1) That the petition is duly signed,
- (2) That the economic stability of the agricultural industry is being or is about to be imperiled by prevailing market conditions,
- (3) That agricultural waste is occurring or is about to occur,
- (4) That the institution of a program will conserve the agricultural wealth of the State and will prevent threatened economic waste,
- (5) That the program will advance the public welfare,
- (6) That the program will be conducted without permitting unreasonable profits to the producers and that the commodity named in the petition cannot be marketed at a reasonable profit otherwise than by means of such a program, and
- (7) That the proposed zone of proration includes all of the producing territory within the State reasonably necessary to render the program feasible.

In the event the Commission finds the foregoing situations to exist, a proration program for the commodity in question will be effected as follows:

The Commission will select a proration program committee of five producers and two handlers operating within the zone. Such committee shall determine the method, manner and extent of prorating. The program evolved by the committee is, however, subject to the approval of the Commission. This committee must also select an agent, approved by the Commission, to administer the proration program on behalf of the Commission.

The enforcement of proration programs is to be undertaken by means of certificates. Each grower will receive from the agent in a proration zone certificates which set forth the volume and time of harvesting or other preparation for disposal. The certificates must accompany all de-

liveries of the prorated commodity by producers. It is made unlawful for any dealer or handler within the state to have in his possession any commodity produced in an established proration zone upon which a proration program has been instituted without an accompanying certificate issued under the authority of the Commission. Proration programs are to be financed by the collection of a proportional fee for each certificate issued to producers.

The foregoing description of the act is necessarily brief. Those who desire further information concerning it may obtain copies of the law from the Bill Room of the California Legislature at the State Capitol, Sacramento, California, by requesting Assembly Bill No. 1122 or Chapter 754 of the 1933 California Statutes.

The Act raises several important legal and economic questions. The writer made a study¹ of a number of them at the request of the California State Farm Bureau Federation and the California State Chamber of Commerce prior to the introduction of the bill which later became the Prorate Act.

The act became effective August 22, 1933. This was too late for many groups to invoke its provisions this year because their crops will be harvested and marketed before a proration program can be instituted. Several groups who contemplated programs under it are now exploring the provisions of the Agricultural Adjustment Act and formulating codes which aim to set up proration programs under its provisions.

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REDUCTION OF FARM TAXES THROUGH CHANGES IN RURAL GOVERNMENT

A study of possible farm tax reduction through enlargement of the administrative areas of local government is now under way in Wisconsin.¹ The first studies, begun in the summer of 1931, have been completed and the results published in a special mimeographed bulletin of the University.² For the study of town and other local governments, Washburn county was selected, and for the study of county consolidation this county and two neighboring counties were chosen. All three counties are in the cut-over area where tax delinquency and other fiscal problems are important. The study is being continued this year in areas of another state.

An analysis of the cost of government of all the 101 units within Washburn county—school districts, townships, villages and cities—as well as the county showed that 20 per cent of all expenditures went for highways, 50 per cent for education, and 30 per cent for all other purposes. This total cost of government, however, is not borne entirely by local taxpayers. The state aids, especially for schools and roads, carry 28 per cent of the costs, the general property tax 59 per cent, and other

¹ A mimeographed report of this study is available through the Giannini Foundation of Agricultural Economics at Berkeley, California, entitled "Economic and Legal Aspects of Compulsory Proration in Agricultural Marketing."

² This is a joint project of the University of Wisconsin and the Bureau of Agricultural Economics.

³ "Possible Farm Tax Reduction Through Changes in Local Government." Special Bulletin, March 1933.

forms of taxation and other sources of income provide for the remaining 13 per cent. Because of the importance of schools and roads, these two items were given special attention.

Schools. Savings can be made by at least three different types of changes in the administration of rural schools: (1) The pupils of many of the smaller schools might be transported to neighboring schools. The cost of transportation would be less than the salaries of teachers who would no longer be needed. This type of change, which is actually taking place in some instances, leaves the school district organization as it now exists. (2) More savings can be made by consolidating the districts. Of the 76 districts in Washburn county, 49 of them could be consolidated into 15 larger districts with possible savings ranging from 3 to 24 per cent of the 1931 costs, the average being 8.3 per cent. Twenty-seven of the present districts could not reduce costs by consolidation. (3) If the county-unit school system, under which the districts would be abolished and a county board of education substituted, were to be adopted, \$15,000 could be saved annually. This represents 8 per cent of the cost of operation and maintenance of the present 76 districts, or about 15 per cent of the school district levies.

Two obstacles stand in the way of the second and third plans; one is that state aids would be lost unless the laws are changed to meet the new situation, and the other is the fact that in spite of savings for the county as a whole, some districts which are now operating economically would have their tax rates increased. The question of whether the county-unit system should include the city schools also complicates the situation.

Roads. More than 70 per cent of all the roads of Wisconsin, and 72 per cent of those of Washburn county, are administered by the townships. By placing all township roads under county administration, about \$15,000 could be saved annually in Washburn county, provided the roads were classified by traffic needs and each type of road were maintained on this basis. This possible saving amounts to 38 per cent of the township road money spent in 1930.

Counties. Because of the rather widespread interest in county consolidation, this study included estimates of possible savings which could be made if Burnett, Washburn, and Sawyer counties were merged. In 1930 it cost \$101,381 to operate the three counties. If they were consolidated, at least \$9,000 could be saved by having one set of county officers instead of three sets. The savings might range from \$2,200 in the case of the register of deeds to nothing for the district attorney's office, since the present district attorneys are on a part time basis. Little can be saved in the sheriff's office because so much of the cost consists of travel and deputies.

Wisconsin has two types of "county legislatures." One is the board of supervisor type under which every township, village, and city ward is entitled to a member on the board. This results in unwieldy boards, with as many as 75 members in one large county. However, counties are permitted to adopt the "commissioner plan" under which from three to nine members are chosen, depending on the population of the county. Four counties have adopted this form of board, including Burnett.

The cost of the county board of supervisors would be increased if the consolidated county were to adopt the supervisor system. However,

if it had five commissioners, the total savings would be increased from \$9,000 to \$13,500; and if the merged county adopted the county-unit school system and transferred township road administration from the townships to the county, an additional \$5,000 could be saved. Adding the possible annual savings in the court house and jail maintenance costs, the total would be \$20,000 a year. This amounts to 5.6 per cent of the 1929 tax levies of the three counties, or not quite one-fifth of the \$101,381 expended for operation and maintenance in 1930. For the citizens of Washburn county, about \$9,000 could be saved.

Townships. The 21 townships of Washburn county spent \$72,538 in 1930, of which \$39,263 was for highways, and only \$14,385 for general government. Consolidating these townships into four would make possible an additional saving of about \$4,500.

Conclusion. If the people of Washburn county were to adopt all the suggestions made above, \$43,500 could be saved yearly. It is estimated that \$38,000 of this sum would accrue to the rural sections of the county, which was about 20 per cent of the 1931 tax levy on rural property. Thus, for every \$100 of farm taxes paid in 1931 a reduction of \$20 might be realized as the result of these changes. However, a particular farmer might save more or less depending upon the present tax rate in his own school district or township. Through equalization of tax rates some farmers would have their taxes raised. Others might lose more income from road work and other public service than they would gain in tax reduction. Moreover, it should be borne in mind that all estimates of possible savings to local taxpayers are based on the assumption that state aids would not be reduced as a result of the changes considered and that the savings would be used to reduce taxes rather than to improve services.

It will be noted that all the suggested changes involve greater centralization of administration. County administration of township roads and rural schools would afford an opportunity for greater economy in expenditures for these purposes. Consolidation or enlargement of townships and counties would spread the administrative costs of these units over a larger tax base. This would mean, for example, that the three counties could maintain one court house instead of three. The advantage of enlarging counties, at least for certain purposes, would be even more apparent if these three counties should undertake to establish three separate county normals or poor farms instead of one. None of these counties has either of these types of institutions at the present time. It should be added, however, that the enlargement of counties or townships should be made with the natural, economic and social features of the communities in mind.

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VALUE OF ILLINOIS FARM LAND

(BASED UPON EXPECTED INCOME WITH PRICES OF FARM PRODUCTS
AT PRE-WAR LEVELS)

Over a long period of time the value of farm land should be based mainly upon the earnings from the farm business. This basis was not adhered to in evaluating corn-belt land up to a few years ago. Farm land, in newer agricultural regions, including much of the corn belt, has been evaluated on the basis of anticipated selling price rather than expected earnings. In attempting to evaluate farm land on the basis of expected earnings there is apt to be a lack of close distinction between the value of different grades of farm land. Emphasis may well be placed on the fact that the most productive land is generally undervalued relative to the less productive land. This statement is verified by many studies of land values and earnings. The problem in the future, as it applies to this part of the United States, is largely two-fold: first, land appraisals must be based upon expected earnings rather than the anticipated selling price; second, the expected earning power of the land should be arrived at on the basis of productive power for the different grades of land.

Expected Farm Income

The following discussion attempts to show the estimated income and expenses on the most productive Illinois farm land based on the pre-war level of prices. In this discussion information secured from closely supervised farm financial records are used to indicate what income and expenses may be expected. The records are of 280 farms on the better grades of land in Livingston, McLean, Tazewell, and Woodford Counties for the years 1929, 1930, and 1931.¹ The average prices of crops for 1905 to 1914 and also for 1910 to 1914 are used in calculating the expected income and expense. The average yearly prices received by Illinois farmers for their major crops for the periods 1905-14 and 1910-14, respectively, were as follows: corn \$.547 and \$.58 per bushel, oats \$.377 and \$.374 per bushel, wheat \$.903 and \$.916 per bushel, barley \$.636 (1908-14 only) and \$.634 per bushel, soybeans (not reported for first period) and \$.95 per bushel, and hay \$12.61 and \$13.96 per ton. The average yearly price was considered more representative than the price for a particular month.

The expected income based upon these records was arrived at by using:² (1) the value of the average quantity of grain sold for the three years at pre-war prices, and (2) the value of feed fed to productive livestock determined by the quantity of feed actually fed valued at pre-war feed prices. When income from livestock production was calculated

¹ These 280 farms are part of the farms included in the Farm Bureau-Farm Management Service, a cooperative farm management project developed by the University of Illinois in cooperation with county farm bureaus in the counties named. The cooperating farms pay about two-thirds of the cost of the service, including the full-time employment of a well-trained farm management man who visits each farm several times a year and assists in keeping, summarizing, and interpreting the results of carefully kept accounts. (See mimeographed reports of the Department of Agricultural Economics Nos. M-339 and M-383.)

² The bases used appear conservative and are the most accurate of the methods available for estimating income. The conservativeness of the approach is shown by the fact that the production of grain for these three years is lower than normal. For example, the three-year average yield of corn was 44 bushels per acre, while the average for eight years, 1925 to 1932, was 48.4 bushels for the group of farms included in this project.

for adjusted prices the expected income from the feed fed to productive livestock was determined by using the average return for feed fed to productive livestock on this group of farms for an eight-year period, 1925 to 1932 inclusive. That is, over the past eight years a comparable group of farms including many identical farms showed in this region that farmers received \$141 for \$100 worth of feed fed to productive livestock. This calculated income from livestock at adjusted prices is definite and does not involve estimates of feed requirements and livestock efficiency.

This shows the experience of actual farmers over a period of years long enough to represent normal price relationships between crops and livestock. Table 1 indicates the expected income, from the various sources, for the average farm, as calculated on the basis explained. The \$23.63 income per acre represents the expected income based upon 1910 to 1914 prices. If the average prices for 1905 to 1914 are used, the expected income is \$22.55.

TABLE 1.—VALUE OF PRODUCTS ON A TYPICAL 240-ACRE FARM BASED UPON THE AVERAGE OF 280 FARMS ON HIGHER-VALUED LAND IN LIVINGSTON, McLEAN, TAZEWELL, AND WOODFORD COUNTIES, 1929-30-31, CALCULATED ON BASIS OF ACTUAL CROP PRODUCTION AND AVERAGE RETURNS PER \$100 FEED FED TO PRODUCTIVE LIVESTOCK, USING 1910-14 ILLINOIS FARM PRICES FOR CROPS

Crop produced	Acres produced	Yield an acre	Total production	Amount sold	Income from part sold	Value of part used
Corn.....	105	44	4,620	2,390	\$1,386	\$1,293
Oats.....	45	44	1,980	1,063	398	343
Wheat.....	16	24	384	291	267	85
Barley.....	7	30	210	—	—	133
Soybeans.....	7	20	140	—	—	133
Hay.....	15	1.6	24	—	—	335
Pasture (days).....	30	81.8	2,454	—	—	160
Farmstead, etc.....	15	—	—	—	—	—
TOTAL.....	240	—	—	—	\$2,051	\$2,482
<hr/>						
Total feed fed to horses.....						335
Feed fed to productive livestock grown on farm.....						2,147
Feed purchased fed to productive livestock.....						356
Total feed fed to productive livestock.....						2,503
8-year average of returns per \$100 feed fed to productive livestock (1925-32).....						141
Total returns for feed fed to productive livestock.....						3,529
Total returns of feed crops sold.....						2,051
Miscellaneous farm income.....						92
Total returns for the entire farm.....						5,672
Total returns per acre.....						\$23.63

The expected income per acre for the 56 most profitable of these 280 farms calculated the same way amounts to \$28.07 when the 1910 to 1914 prices are used. The income per \$100 worth of feed fed to productive livestock averaged \$156 for these farms. Since the average per acre expense on these 56 farms was less than the average for the 280 farms, the difference in the evaluation of the productive power of the land would be proportionately greater than the difference in the expected income. It should be recognized, of course, that the difference is due largely to the ability of the present operators of the land and the way the farms have been managed for some years.

Another way to calculate the expected income is to use actual acreages and yields of the various crops grown and to value the crops at pre-war

prices. This method would have special application in evaluating land not operated by the owner and where his share on the best land normally represents one-half of the crops. The expected income based upon crop production (without livestock) at 1905-14 prices was \$18.71 per acre and at 1910-14 prices \$19.66 per acre.

Expected Farm Expenses

It is more difficult to calculate expected expenses, with the same high degree of accuracy, than it is to calculate expected income. This greater difficulty is due to the lack of definite prices of items purchased and the necessity of estimating the value of operator's and family labor and investment. However, expenses per acre, not including operator's or family labor or interest on capital invested, were \$9.07 for the average of the 280 farms for the three-year period. These were the expenses when the price index of commodities bought by farmers was 142.3. With the index of 142.3 reduced to 100, which represents the period 1910 to 1914, the acre cost would be reduced to \$6.37. Records for 1932 from 430 similar farms in the same part of the state show practically the same results. Expenses in 1932 were \$6.82 per acre with the expense index at 109. Reducing the expense index from 109 to 100 reduces the per acre expense to \$6.26. It is significant that the two methods of computing farm expenses are so nearly the same figure: \$6.37 and \$6.26 per acre.³

These expenses do not include the value of the labor of the operator and members of the family. One method of evaluating this labor is on the basis of "normal" family expenditures. The farm family must receive an income to cover its living expenses. It seems logical to assume that the average cash expenditure for representative farm families would represent a fair standard of expenditures. According to records kept for the Department of Home Economics, University of Illinois, farm family expenditures for 1929, 1930, and 1931 averaged \$1,144⁴ on typical Illinois farms. Assuming a 240-acre farm, this amounts to \$4.77 per acre. The income above the total of the expenses discussed may be regarded as return to the capital invested.

Expected Net Farm Income

On the average of the 280 farms there was \$14,854 invested in things other than land. There was \$5,967 invested in farm improvements, \$3,048 invested in livestock, \$3,675 in feed, grain and supplies, and \$2,164 invested in machinery and equipment when evaluated on the basis of the 1929, 1930, and 1931 price level. At 6 per cent interest, the charge for these investments, not including the improvements, would be \$2.22 per acre. Adding \$6.37 farm expenses, \$4.77 family expenses, and \$2.22 in-

³ If taxes (\$2.09) are deducted from the average expenses of \$9.07 per acre, not including operator's or family labor, the expenses would be \$6.98 per acre for the 280 farms for 1929-30-31 and \$5.14 for the farms for 1932. (Taxes in 1932 were \$1.68 per acre.) This represents a decrease of 19.6 per cent in the taxes between the two periods. Taxes for the United States, as shown by United States Department of Agriculture, were reduced by 19.5 from 1929 to 1932. The valuation of taxable farm property (land and improvements) in Illinois was decreased 23.25 per cent from 1929 to 1932. The valuation of taxable farm property in the four counties included in this study was reduced 28.60 per cent during the same period. The cost of things other than taxes was reduced by 26.3 per cent from the 1929-30-31 average to 1932 (\$6.98 to \$5.14). The main drop in taxes came in 1931 and 1932. In view of these facts it seems logical to conclude that the reduction in tax costs was approximately the same as for other costs.

⁴ Adjustment Conference Booklet, 1932, University of Illinois, page 35.

terest, the total expense would be \$13.36. Deducting these expenses from the \$23.63 expected income the net income per acre would be \$10.27. Capitalizing this at 5, 6, and 7 per cent the value of the land and improvements would be \$205, \$171, and \$147, respectively.⁵

The expected income on the average of 280 farms computed on a strictly grain basis is \$19.66 per acre. When the expected income and expenses are divided between landlord and tenant according to customary practices, the net income per acre to landlord would be \$7.26 per acre. (Table 2) When this income is capitalized at 5, 6, and 7 per cent the value of the land alone would be \$145, and \$121 and \$104, which corresponds closely to the value of land alone arrived at for the average of the 280 farms.

TABLE 2.—AVERAGE VALUE OF PRODUCTS SOLD AND EXPENSES ON 280 FARMS ON HIGHER-VALUED LAND IN LIVINGSTON, McLEAN, TAZEWELL, AND WOODFORD COUNTIES, 1929-30-31, WHEN DIVIDED BETWEEN LANDLORD AND TENANT ACCORDING TO CUSTOMARY METHODS OF LEASING, USING 1905-14 AND 1910-14 ILLINOIS FARM PRICES FOR PRODUCTS SOLD

	Average of all 280 farms			
	1910-14 price level		1905-14 price level	
	Tenant	Landlord	Tenant	Landlord
Income from crops.....	\$2,211	\$2,211	\$2,108	\$2,109
Income from pasture.....	—	181	—	167
Miscellaneous income.....	92	—	86	—
Total income.....	\$2,303	\$2,392	\$2,194	\$2,276
Total income per acre.....	9.65	10.01	9.18	9.53
Total expense per acre ^a	4.08	2.75	4.07	2.75
Net income per acre.....	5.57	7.26	5.11	6.78
Operator's net income.....	\$1,337	—	\$1,226	—
Landlord's per acre income				
capitalized at 5 percent.....	—	145	—	136
6 percent.....	—	121	—	113
7 percent.....	—	104	—	97

^a Landlord's expenses include taxes \$1.69, farm improvements \$1.02, and miscellaneous expense \$.04 per acre. Operator's expenses include all other farm expenses. The farm income is adjusted to a strictly grain farming basis, but the expenses represent the actual expenses incurred on these farms. The landlord's share represents conditions as they actually are under a typical grain share lease except that one-half of the value of hay and pasture is credited to the landlord in the place of a set cash rent which is not materially different from normal rent for these items. The tenant's share shown in the above table is not pertinent to this illustration.

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EFFECTIVE COLLECTION OF FARM PRACTICE DATA

The marked reduction in research budgets brings to the front the problem of reducing the cost of collecting the necessary data. With the rapid changes which have taken place in the technique of farming during the past twenty years, much of the data gathered earlier are now out of date. Changes in technique brought about through the use of tractors, combine harvesters, corn pickers, and similar implements, as well as the shifts in areas of production have changed greatly the requirements and

⁵ When the investment in improvements is figured as an expense at 6 per cent the total expense per acre would be \$14.85, leaving \$8.75 net income. Capitalizing this net income at 5, 6, and 7 per cent the value of the land alone would be \$176, \$146, and \$125 per acre respectively. When the expected income and expenses on the 56 most profitable farms of this group are calculated by this method, the capitalized value would be increased to \$265, \$221, and \$189.

combinations of elements of production. Furthermore, recent rapid price changes have further changed farm practices making up-to-date data necessary. How most effectively to collect the necessary data, or bring old data up to date, with the least expenditure of time and money is a vital problem to every farm management research worker.

The account routes provide the necessary data but at a relatively high cost per record, are slowly available, and provide too small a sample. On the other extreme farm business surveys and simple farm accounts do not provide necessary farm practice data. Enterprise studies, which up to date, have probably been the most efficient source of practice data do not permit studying the interrelationships among enterprises and other parts of the farm business. But even the crop enterprise studies cover only one year at a time and must be continued over a period of years to average out peculiarities and abnormalities of individual years.

Averages obtained from three or four years of actual crop records may be greatly distorted by the inclusion of one highly abnormal year. While it may not be good statistical practice to consider time series as part of the sample it must be acknowledged that yearly variations in crop data are frequently wider than variations between farms. Most crop data other than yields have a coefficient of variation from year to year of 10 to 20 per cent in either direction from the mean. Yield data are subject to even wider variations and hence a few years are likely not to be sufficient for accurate judging of farm practices.

The general method of collecting data proposed by the writer as being the most efficient is the modified route. It is proposed that outstanding farmers, the apparently more progressive leaders of the area who follow newer procedures and who seem to be the most successful farmers be selected. By this method it is possible to see what practices are followed by the more successful farmers; what expenditures of labor, power, equipment, materials, and what output may be expected from good farming; and to what extent the successful farmers are following practices recommended by colleges and experiment stations. At the same time the work of the study is made easier because it is not cluttered up with an unwieldy mass of average data which tend to cover up the desired information. Even a select group provides examples of poor and average farming for the sake of comparison. Few farmers excel in all phases of their business.

But regardless of what method is used in collecting the data the writer proposes that more attention be given to obtaining data which portray "normal" as well as the current, possibly abnormal, conditions. He proposes that data covering crop practices should cover not only (1) the current year, but, also (2) the "normal," and (3) the "range" for any given situation. The data should not only cover the current year, but should indicate the extent to which the current year is abnormal, and to what extent variations from the normal are likely. For example, data covering the rate of plowing with a tractor should record that an individual farmer plowed only 5.5 acres a day this year because of the dryness of the soil, but that he usually plows 6.5 acres, and never plows less than 5.0 acres, or more than 7.5 acres in a ten-hour day. The usual date of planting, as well as the earliest and latest dates, should be recorded. Similarly, the current wheat yield was 34 bushels, but it should also be

recorded that this was the largest he has ever had, and that a ten-year average yield on his farm would be 22 bushels, and that he has had yields as low as 10 bushels of wheat an acre. Such data are necessary not only in determining the extent to which a given year is abnormal but also in planning the farm business to meet possible extreme conditions. The failures of synthetic analysis in farm management have been due more largely to the lack of suitable and accurate data than to fallacious reasoning.

By visiting the farms several times during the growing season and recording data on operations soon after they have been performed it is possible to obtain reasonably accurate records of the operations without the use of daily labor records. This may be done by recording the kind of operations performed, the dates of the first and last operations, the order in which they were performed, the number of times operations were repeated, and the rate of work expressed in acres, tons, or bushels per day of specified length. This may then be checked against the farmer's estimate of the total time consumed in any given operation. Records obtained by this method when compared with daily labor records show that there is little difference in results. Care must be exercised, however, to include all the operations and not to use extremes as normals. With this precaution there is little indication that the farmer is consistently optimistic in reporting rates of work.

The advantages claimed for the proposed method of gathering data are; (1) by recording the "normal" and the "range," data are provided which otherwise would be available only from studies conducted for several years; (2) through recording the operations performed, and rates of work it is possible to obtain data which compare favorably with data otherwise obtained from cumbersome daily labor records; (3) studying outstanding farmers provides data on improved practices which are more useful than the study of average farms; (4) by this method the data from a relatively large number of farms may be quickly collected, analyzed, and presented while the results are applicable; (5) through requiring less time both for collection and analysis the cost of conducting such a study is reduced materially.

There is, however, another important use of farm practice data other than that associated with physical requirements. This is in accounting for variations in farm income as indicated by financial studies. The analysis of farm businesses based on farm accounts has been of immeasurable service to the individual farmers keeping the records and it has provided a body of valuable farm management data but the analysis of farm accounts reaches a definite obstacle when it attempts to explain why certain farms obtain greater enterprise returns than others. Simple farm accounts do not provide sufficient data on "how" enterprises are conducted to determine the practices which are responsible for variations in income. They do not show, for example, whether low pork sales on a given farm were due to poorly balanced rations, poor sanitation, or to marketing at the wrong time of the year. They do not show whether poor labor efficiency is due to lack of equipment, small teams, poor chore organization, or the inclusion of unnecessary work.

It is in the answering of such questions as these, in refining and making more useful the farm business analyses, that data on practices and

methods may be of great value. For this reason the modified route method of keeping farm accounts in combination with the farm practice data has made it possible better to analyze the farm business. Practice data permit establishing relationships between cause and effect under actual farm conditions, and the even more important determination of the total effect of the combination of several causal factors under actual farm conditions where supplementary relationships are involved. With this in mind, farm management men in Michigan have recently obtained data regarding the more important farm practices from farm account keepers at the time of the closing of the year's records. The result has been that practice data have pointed the way to answering many questions regarding the success or failure of particular phases of the farm business and have made analysis more helpful to the individual farmer.

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INTERDEPENDENCE OF FARM REAL ESTATE VALUES AND CERTAIN SOCIAL FACTORS¹

The object of this study is to discover, principally by the use of published census data for 1930, measures of association existing between the average value per acre of farm real estate and selected social factors in the sixty cotton producing counties of Oklahoma. Ezekiel's method of correlation analysis was used throughout the statistical operations. The purpose was not so much to establish cause-effect relationships as to find the degree of concomitance between variations in the average values of farm real estate per acre and the several independent factors which were chosen.

In the preliminary work four trial problems were set up. The census value of farm land and buildings per acre was used in each of the problems as the dependent variable. Three independent variables were used in the first, second and third problems. In the fourth problem five independent variables were employed. In all there were 14 independent variables introduced into these four preliminary problems. When the solutions were made, the variables which gave no significant correlations were eliminated and a fifth, or final, problem was set up according to the same procedure that was followed originally, but a new independent not previously used, the per cent of church members in the total population, was added. The purpose of this procedure was to find out which of the factors commonly associated with farm land values seemed to be of sufficient importance to justify any serious consideration in the study. However, it is to be remembered that the census value placed on farms is largely an arbitrary figure, and, therefore, it may have only a minimum of factual reliability. The final results are set forth in the following table.

In the accompanying table, a summary of the results obtained from the final computations is given. This tabulation is so made that by reading from left to right, the figures opposite each independent variable gives its net coefficient with \bar{X}_1 , which is understood to be the average

¹ Summary of a paper given at the annual conference of Southern Agricultural Workers held in New Orleans, February 1-3, 1933.

TABLE OF RESULTS WHEN X_1 , THE AVERAGE VALUE OF FARM LAND AND BUILDINGS PER ACRE, IS CORRELATED WITH CERTAIN SPECIFIED SOCIAL FACTORS

Independent variables*	Regression coefficients, or b 's	R^2 (Uncorrected coefficient of determination)	\bar{R}^2 (Corrected coefficient of determination)	\bar{R} (Coefficients of correlation corrected)	$\sigma \pm \bar{R}$ (Standard error of R)	Partial β coefficients
X_1	-.22237	+.1067	+.0922	-.30	$\pm .095$	-.238
X_2	+.02834	+.0612	+.0529	+.23	$\pm .018$	+.166
X_3	+.34430	+.1342	+.1160	+.34	$\pm .135$	+.278
X_4	-.06295	+.0388	+.0335	-.18	$\pm .085$	-.077
X_5	+.49521	+.1913	+.1654	+.41	$\pm .180$	+.311
X_7	+.00414	+.0005	+.0004	+.02	$\pm .255$	+.002
Total	—	+.4551	+.3934	+.63	$\pm .748$	—

* X_1 = the percent of all gainfully employed males engaged in agriculture; X_2 = the number of emigrants from farms per 10,000 of the farm population; X_3 = the percent of farm homes having telephones; X_4 = percent of all farmers having passenger automobiles. These data were derived from the 15th Census of the United States, Agriculture, 2nd Series, Oklahoma, 1930. X_5 = Brown's Index of School Efficiency (E. E. Brown, *A Statistical Survey of Education in Oklahoma*, State Department of Education Bul. No. 10, 1925, p. 39); X_7 = percent of church membership in total population (United States Census of Religious Bodies, 1926, Vol. I, pp. 661-663).

value of farm land and buildings per acre as given by the 1930 census for each county included, when all the remaining factors are held constant. Also, the total or combined multiple coefficients are given. It should be observed, however, that each figure in this table is the result of a distinct computation, and that the totals are not simple arithmetic sums.

While it is not claimed that the independent variables employed in this problem represent true determinants of land values, from casual observation it was thought that their concomitance with variations even in nominal farm real estate values would be closer than was found through the techniques employed. Perhaps the intangibility of the results obtained arises out of a rather high degree of subjectivity in both the dependent and the independent variables studied. It is also likely that such conditions as heavy bonded indebtedness resting upon land, an excessive degree of fluidity of the population, and an over-investment in mechanical improvements may actually tend to depress farm land values after a point of saturation is found. It seems contrary to reason that land can continue to support institutions and material improvements indefinitely. To find, under given conditions, the limits within which farm land can support various forms of social advancement without sacrificing its own value would be a highly commendable piece of research from the standpoint of practical application. The results given in the foregoing table are not wholly convincing, but they do support a plea for further research on this problem.

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BOOKS RECEIVED

- Aus dem Internationalen Landwirtschaftsinstitut in Rom, Berichte über Landwirtschaft, I Jahrgang, Heft 1.* Berlin: Paul Parey. 1933. 59 pp.
- Baker, O. E., *Rural Urban Migration and the National Welfare*. Cambridge, Mass.: Association of American Geographers, Annals Vol. XXIII, No. 2. 1933. 47 pp. \$.75.
- Black, J. D., Editor, *Research in Farm Labor—Scope and Method*. New York: The Social Science Research Council. 1933. 84 pp. \$.60.
- Black, J. D., Editor, *Research in Agricultural Income—Scope and Method*. New York: Social Science Research Council. 1933. 158 pp. \$.70.
- Davies, George R. and Crowder, Walter F., *Methods of Statistical Analysis in the Social Sciences*. New York: John Wiley & Sons, Inc. 1933. XI, 355 pp. \$3.25. (Reviewed in this issue.)
- Gee, Wilson and Terry, Edward Allison, *Cotton Cooperatives in the Southeast*. New York: D. Appleton-Century Co. 1933. XIII, 272 pp.
- Grosskopf, J. F. W., *Rural Impoverishment and Rural Exodus. The Poor White Problem in South Africa*. Report of the Carnegie Commission, Vol. I. Stellenbosch: Pro Ecclesia-Drukkery. 1932. XXXIII, 245 pp.
- Kolb, J. H., *Meeting the Farm Crisis*. Chicago: American Library Association. 1933. 24 pp. \$.25.
- Leake, H. Martin, *Studies in Tropical Land Tenure*. Port-of-Spain, Trinidad: Government Printing Office. 1933. 56 pp. 2s. (Reviewed in this issue.)
- Report on the Marketing of Livestock in Scotland*. Edinburgh: His Majesty's Stationery Office. 1933. 129 pp. 1s net. (Reviewed in this issue.)
- The Agricultural Situation in 1931-32*. Rome: International Institute of Agriculture. 1933. VIII, 536 pp. 25 liras.
- Timoshenko, Vladimir P., *World Agriculture and the Depression*. Ann Arbor: Michigan Business Studies, Vol. V, No. 5. 1933. 123 pp. \$1.00.
- Wheat Studies, Vol. IX, No. 9, *Britain's New Wheat Policy in Perspective*. Food Research Institute, Stanford University. 1933. 46 pp. \$1.00. (Reviewed in this issue.)

BOOK REVIEWS

World Agriculture; An International Survey, by a Study Group of the Members of the Royal Institute of International Affairs. London: Oxford University Press, 1932. Pp. 314. \$3.50.

This international survey of world agriculture issued by the Council of the Royal Institute of International Affairs, is a joint product. It is the report of a study group under the chairmanship of the Viscount Astor. Any attempt to cover the economic conditions of the industry from a world standpoint, even in broad outlines, must of necessity be sketchy. Generalization is an outstanding characteristic. Indications are that much effort has been expended in the reduction of masses of detail into summary statements. Hence the publication is best suited for the use of those readers who desire an introduction to the economic phases of agriculture in their broader aspects. Undoubtedly this is the purpose of the survey. It covers a wide diversity of topics such as: Production and consumption of agricultural products; international trade; use of improved technical methods, returns from agricultural enterprises, price movements, national policies, protection, and national and international organizations of producers. Obviously such a compilation will not meet the needs of the specialized student.

In discussing national aims and conditions of agriculture in various parts of the world, the nations are classified into groups. The characteristics of the groups are of interest. The United States is in a class by itself, as a region where farming is carried on by large capital expenditures, involving a highly developed technique. The saving of labor is the goal.

Argentina and the British Dominions are placed in a group described as being relatively new in development, and outstanding exporters of agricultural commodities. These countries find themselves in extreme difficulties arising from the disproportionate fall of prices of agricultural products as compared with the decline of prices of manufactured goods. Governments are striving to promote home manufacturing. Their problem is that of expanding exports of raw materials and at the same time protecting the domestic manufacturer.

Europe with the exception of England, has the traditional policy, not of saving labor, but providing work for her laborers. Here farming assumes a political and social aspect as well as an economic one. The production of raw materials is closely related to the problem of national defence. This relationship explains, in some measure, the policy of stimulating artificially, agricultural production. The government policy of Germany, Italy and France is directed toward the goal of self-sufficiency.

The dominant characteristic of eastern Europe is its agricultural reforms, resulting in the breaking up of large estates into small peasant properties. Agriculture predominates in this area.

Russia, of course, forms a single classification. No other nation has approached it from the standpoint of government control and supervision of agricultural operations.

In the large countries of Asia,—India, China, and Japan—the population presses upon the food supply. Land is at a premium. Holdings are small. Standards of living are low. Cultivation is centered upon products suitable for human consumption.

The tropical and subtropical regions are rapidly increasing in im-

portance. The luxuries of yesterday which they supplied have become the necessities of today.

The tariff policies of the great colonial empires is of especial interest to the student of international agricultural affairs. These are tersely summarized in the following paragraph.

"France, America, and Japan adopt, in the main, the assimilation system, with 100 per cent preference for the goods of the metropolitan Power in the colonies. Portugal, Spain, and Italy have a system of colonial preferences. The British system is in a state of flux, but has hitherto provided only small preferences. Belgium and Holland have the open door in their colonies, Belgium under treaty obligations as regards the Congo, and Holland by policy. But the Dutch colonies must ship their produce in Dutch bottoms, which is in fact a protective measure."

It seems to the reviewer, that the tendency toward the forming of customs unions, and the proposals of the agrarian bloc of eastern Europe merit fuller consideration than has been given. It is not at all improbable that these manifestations mark the beginning of international movements that may exert substantial influences upon the welfare of agriculture. Stabilization schemes are granted space more nearly in keeping with their importance. The analysis and interpretations of the Federal Farm Board's stabilization operation will be of special interest to American readers.

The viewpoint of the internationalist with respect to agriculture is admirably stated in the summary:

"The rescue of agriculture from its present plight depends primarily on a steady increase of demand for its products, i.e., on a continuous rise in the standard of living. This, in its turn, with all that it implies, such as the reabsorption in productive occupations of the millions of unemployed industrial workers, is dependent upon an improvement in world political, financial, and economic conditions. Measures designed specifically for the assistance of agriculture, usually of a restrictive nature such as are now commonly advocated, may alleviate symptoms of agricultural distress; they cannot remove the fundamental causes of the disease which are world-wide. Acting alone the agriculturist and his friends may usefully work for the rationalization of production and marketing, for the better grading of their products, for the improvement of statistical services, and the dissemination of information. Action, even on these lines, however, can do little towards re-creating in the minds of men that all-important feeling of confidence in the future, without which it will be difficult to remove the many political and economic obstacles which at present impede the revival of international demand for the products of agriculture. Of the modern world it is true to say that it is becoming increasingly difficult for one state to harm the interests of another without injuring its own economy. Only large-scale action in which all the most important nations will collaborate can hope to overcome world-wide difficulties."

If the publication promotes the adoption of this philosophy, it will have served, in the opinion of the reviewer, an important and useful purpose.

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Methods of Statistical Analysis in the Social Sciences. By George R. Davies and Walter F. Crowder. New York: John Wiley and Sons, Inc., 1933. Pp. ix-355. \$3.25.

Those concerned with a beginning course in statistics will find this book stimulating and suggestive. It covers the generally accepted group of topics included in such a course; averages, dispersion, index-numbers, trends, time series analysis, correlation and a short discussion of probability and frequency curves. The mechanics of the computation of the various measures and coefficients are especially well presented. There are 88 well chosen examples, illustrative of these procedures given in the text.

The authors present only a brief sketch of the collection, editing and tabulation of data, holding that the procedures involved relate to the special fields of study and such generalizations as may be made are largely obvious platitudes. They have emphasized the shorter methods of carrying on computations. For example, the discussion of trends begins with straight lines fitted from mid-points of the series, while parabolas, geometric curves and the Pearl-Reed growth curves are fitted from three selected points. The general method of normal equations receives brief attention under supplementary methods. This has an evident weakness since it makes the student dependent on access to particular formulae, while the knowledge of the simple rules for the formation of the normal equations gives him a more cumbersome but an adequate tool for the solution of all applications involving the method of least squares. The desire for simplicity leads to emphasis of the average deviation for the measurement of dispersion and use of the coefficient of similarity, a device for measuring correlation based upon average deviations, rather than the standard deviation and the Pearsonian coefficient although the latter are explained.

The evident aim is to make the work in statistics more articulate with the devices and methods of formal mathematics. This may prove somewhat confusing to students in agricultural colleges who generally are none too well founded in algebraic manipulations and entirely unfamiliar with the calculus. In the main, however, these are evident appendages and the trend of the discussion is readily followed without their knowledge.

Considerable flexibility in the amount of material to be covered is provided by the inclusion of approximately a third of the discussion of the principal topics under the head of supplementary methods at the close of the chapters. Ample examples for laboratory use together with solutions are provided for each chapter.

For those connected with agricultural colleges there are two important omissions. The first is the procedures of R. A. Fisher, particularly the test of the significance of means. The wide use of these devices in all branches of agricultural experimentation necessitates their inclusion in a course which draws students from other fields as well as agricultural economics. The second is the lack of an adequate discussion of the recent graphic correlation methods. Agricultural economics is perhaps unique in its extensive application of these methods and they have become an important tool in research in that field.

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Prices, by George F. Warren and Frank A. Pearson. New York: John Wiley & Sons, Inc. 1933. Pp. 386. \$3.90.

This book contains valuable data, extensive bibliographical references, and is interesting reading for students of prices. The critical student should read first of all the preface. The first sentence gives the keynote. "The problems of production are being solved so that we can go forward rapidly in well-being if only the exchange system will work." The authors effectively present the difficulties that arise out of fluctuating prices. They present the view that the difficulties are not due to changes in production but to changes in prices as they are influenced by the mediums of exchange. Price is the dynamic force in our economic system. Our price structure is built upon gold. Gold is merely one commodity used in exchange against all others. The production of all commodities is quite stable, and therefore the up and down movements of the general price level are in response to changes in the supply of and the demand for gold. The authors' motives and point of view in presenting this discussion of prices are expressed in the following sentences, also quoted from the preface: "The individual has two tasks. One is to forecast the future of prices and conduct his affairs accordingly. The other is to inform himself and help in guiding public opinion so that national progress may be made."

Among the most important contributions of the authors are improved index numbers of wholesale prices, extended throughout the period of the life of the nation. Heretofore we have had to work with a spliced series. Several pieces had been constructed of different commodities by different methods and upon different bases. Some of the pieces showed monthly variations and others only quarterly or annual variations. Now we have, thanks to their great patience and labor, a reasonably comparable series of monthly wholesale prices, complete without break from 1793 to date.

Another contribution of great importance is the index number of physical volume of production. Available data have been brought together, providing an index number of volume of production for use in analysis of prices. This makes a real contribution even though production data in general are quite incomplete and unsatisfactory for careful analysis. A good way to encourage improvement of data is to begin their use, which will focus attention upon them and reveal their weaknesses as well as the utility or need for reliable data. Similarly it may be said of estimates of population, we greatly need reliable estimates of the population of the world. In using what we have, we must not overlook its inadequacy for use in exacting analysis.

Unfortunately the agricultural production data of the United States, the world agricultural production data, and the world population data are quite incomplete and unsatisfactory for use in any analysis that requires accuracy. The incompleteness of the data is such as to raise doubts both as to rate of growth and short-period variations. However, the data may be used properly as a basis for a limited number of general observations.

The authors recognize that price is a dynamic factor in production, but minimize the importance of changes in production as a factor in changing the general price level. For many years Dr. Warren has been developing the significance of cycles in the production and in the prices of in-

dividual farm products. He recognizes that these cycles vary in length, and that as they are compounded they tend to disappear. Every statistician will, of course, recognize the fact that as the number of commodities in a composite is increased, the average will be smoothed. The total production of all agricultural products and of all commodities is much more stable than is the production of any one commodity. Does it follow that there is no significant production and related price cycle for all agriculture or for all commodities? I doubt that the available data are accurate enough to prove or disprove reasonably a conclusion on this point.

Furthermore, showing that changes in total production of commodities are slight and that there are but small changes in the rate of growth are not conclusive evidences that volume of production is unimportant in determining the general price level. Changes in the costs of production and the elasticity of the demand for commodities must be taken into account. While the demand for some commodities is quite elastic, that for others is quite inelastic. Perhaps the demand for all commodities is inelastic and a very small change in production—a change so small that our crude data are barely sufficient to register it—has great significance in all commodity prices. A speeding up in the rate of production would magnify the effect of a small change and might be a very significant factor in determining our general price and business cycles. A tendency to speed up production generally, after a great war perhaps, is a very significant factor in determining the long-time price declines after such wars.

Even if there were no significant total production cycle or no very significant change in the total production per capita over a long period, it would not necessarily follow that production had no significant influence upon price. The authors' statement (page 62) that "variations in plant capacity are influenced by business cycles and have some influence on cycles . . . but are never the cause of a major depression in all industries" is not a convincing statement. There are innumerable attachments or associations with the cycle of any one important industry. Changes in the total volume of production of any given commodity or group of commodities not only have an important bearing upon the price of the individual commodity in relation to the prices of others, but may have an important bearing upon the average price for all commodities. It has been argued fairly convincingly by some that the cause of a business depression is unbalanced production. The whole exchange system may break down temporarily and the machine almost stop because of the unbalancing of production and distribution of goods. The authors of the book under review may explain the result as causing a change in the demand for gold and thus changing the general price level. It may be more helpful, however, to recognize the significance of unbalanced production as a factor in changing the demand for gold, even if it be considered that the disturbance is thus registered in our economic system.

It follows from the above observations that one may question the conclusion that we have solved our production problems. Perhaps the authors will say that we are rapidly learning how to produce more, and in that sense we are solving our production problems. Perhaps we ought to recognize the questions as to what and how much to produce as being production problems.

The several chapters dealing with money, credit, and uses of silver and gold are followed by a chapter on stabilizing the prize level, which will be read with great interest. The authors state (page 176): "A scientific measure of value, and the ultimate ideal, is a dollar that has a constant buying power, not for one commodity but for all commodities at wholesale prices." A host of problems suggests themselves as one thinks about this conclusion. From many points of view it does state an ideal, but is it practicable? The authors have presented the view that gold is but one commodity being used as the basis of exchange for all others, and is consequently a most unstable basis of exchange and therefore an irrational monetary standard. But such a conclusion is contrary to the developments, if not the progress, of the economic world of the past century. The authors seem to consider the movement toward a universal use of the gold standard to be a matter of accident, but has it been so? The statements made on this point are not convincing in the light of a consideration of what are the requirements of a monetary standard. A review of world experience would suggest that bimetallism or symmetallism might increase the problems of stabilization. The production of silver is less stable than the production of gold. Experience has demonstrated the difficulty of using the two metals separately and, while the combining of these two metals might tend to solve some of the difficulties developed in trying to keep the two metals in use, there is no assurance that the combination would reduce the number of problems that are to be dealt with when most of the world is upon the single gold standard basis.

In discussing the instability of prices and the problems that arise, the great importance of the superstructure of price-making machinery upon the gold standard basis has been overlooked except to a limited extent. With gold as a standard of value, significant changes in the supply of gold will affect the price level, but changes in the superstructure of currency and credit are most important, particularly in the booms and depressions of the business cycle, and not at all unimportant in the long-time price movements. This superstructure depends for the most part upon demand, and is the most disturbing part of our monetary machinery. Nationally it is subject to a considerable degree of control by government action, but internationally it is practically without the possibility of control. Herein, however, are most of the problems of instability.

Admitting the great difficulties that arise out of instability we may still ask, How much stability do we want? The authors admit that stability of the prices of individual commodities and wages is not desirable, and yet they ask for stability of the all-commodity price level. Wishing for a greater amount of stability in the prices of many commodities and in the all-commodity price level, we may still doubt that absolute stability in the all-commodity price level is an ideal. In the first place, of course, commodities do not constitute the whole price or value structure with which we are concerned, and we might argue against stability for all commodity prices on the same ground that the authors admit against the stabilization of individual commodities. Progress requires change. In so far as it is possible to do so, we should plan for the desirable changes and eliminate the undesirable. This, and not merely stability, should be our goal. Having recently had a great war, the present problem is to make

a rational readjustment from a deranged national and world economic organization.

The latter half of the book is devoted to a discussion of causes and results of inflation and deflation. This section includes much price history that will be of great interest to students. Considering the causes of inflation and deflation, it is practically impossible to separate the cause from the effect. The effect is often taken for the cause. According to the authors, deflation profits nobody. "The only just or desirable price level is the level to which society is most nearly adjusted."

The last chapter in the book deals with the price outlook, and the reader will find in it many interesting statements. "The probability of any successful attempt to reduce production by governmental or private action is extremely remote." The authors would go further and say that a successful attempt to reduce production would not have a very significant effect upon the general price level. Neither the supply of commodities nor the demand for commodities will be the source of inflation or deflation. The supply of gold would be about sufficient to support pre-war prices with all the former gold-using world on a gold basis. If gold were demonetized by England and other countries, the result would be a rise in prices; but the attempt to return to the gold standard later would cause a decline. On the other hand, "if all the former gold-using countries return to the gold basis and if the United States continues to maintain its present monetary standard, it is to be expected that commodity prices will average below pre-war for the next ten years." If the latter were to prove to be the real price outlook, a great many further readjustments would have to be made.

The above outlook statement was written before March 4. Reviewing proposals for stopping the deflation, the authors expressed the view that not much permanent value could be accomplished by means of credit expansion, but believed it necessary to raise the price structure by remonetizing silver, changing the weight of the gold dollar, or introducing a stable measure of value. If the price level were restored by any of the means under consideration, prosperity would return. The level to which it would be necessary to restore prices is not specifically stated except to say that the price level must be raised to the debt level or the debt level lowered to the price level.

Finally, there is the cautious advice to the farmer, "Although it is possible that reduced world demand for gold may raise prices, or that a monetary change will be made, the safe policy for any farmer or business concern is to plan for prices below pre-war, but to be on the alert for violent price fluctuations which are certain, for possible changes in the demand for gold, or for a monetary change." The authors apparently believe that only a temporary business recovery can be expected unless the United States undertakes some such monetary measures as suggested to restore and stabilize prizes.

Since this book was written the several propositions for restoring and stabilizing prizes have been given extensive consideration. Several measures have been enacted and are being vigorously executed to aid in the recovery from the depths of the depression. Some improvement has been registered not only in the United States but also in many foreign countries. Apparently a business cycle recovery is under way and the all-

commodity general price level has risen to some extent. The authors find some measure of confirmation of their views in the fact that the stimulus to industry in the past few months has come very largely from a belief that prices would rise and the further fact that the prices of many commodities have moved fairly closely in line with the change in the value of the dollar in international exchange. Further substantial gains, however, wait upon reorganization of industry, a revival of confidence in the future demand for commodities, and a restoration of normal credit relations among producers and consumers.

O. C. Stine

Bureau of Agricultural Economics

Taxation in Minnesota, by Roy G. Blakey and others. Minneapolis: University of Minnesota Press, 1932. Pp. XIII, 627. \$2.00.

It is always difficult for any group of people to work together as a unit in the production of anything so lacking in standardization as the writing of a book. As a rule, books written by groups lack, conspicuously, unity of theme and style. This book is a happy exception. A large number of "Research Associates and Writers" are listed, and their contributions for the most part appear to be designated. A considerable number of the fifteen chapters are complete in themselves to the extent of constituting monographs, yet the whole number makes a series such as one man might have written, and included within the compass of a volume. In other words, the book treats of the tax problems of Minnesota in a reasonably symmetrical manner, and avoids being a mere collection of essays or bulletins. Professor Blakey has done a neat job of coordination, and has, apparently, written three of the best chapters, viz., the first two, "The Tax Situation in Minnesota," and "What Constitutes a Good Tax System," and the last, "The State Income Tax."

While the work pertains, as the title indicates, to the State of Minnesota primarily, it, nevertheless, deals in a broad gauge manner with the general principles and practices of taxation. Probably there would be no occasion for publishing forty-eight volumes like this, covering the situations in all the states of the Union, one by one; however, several more might well be produced without too much repetition.

There is not much in the volume under discussion likely to be rejected by taxation students as altogether wrong or untenable. However, there will of necessity be differences of opinion on many points respecting positive statements on controversial subjects, of which taxation is a conspicuous example. The authors are to be commended for making, as they consistently do, fearless statements throughout the volume. One discussion seems rather clearly open to question, if not even to objection. In the chapter on "Tax Burden on Agriculture," p. 95, it is declared "that interest payments are a more serious burden to the owner of a mortgaged farm than are taxes." It is quite in point to note that interest charges eat up the whole income on some farms. But is interest a "burden" in the sense that taxes are a burden? Taxes are voted by public authority. They are "laid upon" the citizen in order that public funds may be raised. On the other hand, interest is the market price of loaned capital. Were a farm owner to resist the temptation to buy until he had by some means accumulated the money with which to pay for land, he would have no in-

terest burden. It is no wonder that a heavily mortgaged farm, rented to a tenant, will bring the owner no more than enough to pay the interest on the loan. The buyer did not expect prices to fall 50 per cent when he signed the mortgage note. Taxes are not to be condoned because some other bill is just as hard to meet. The chances are that the selling price of the land was too high when last it changed hands. This may make too high an interest charge, even though the rate be moderate.

In the same chapter, the statement is made that: "ordinarily net incomes depend much more upon prices than upon taxes." Obviously. Prices are one of the two major factors which determine income. Taxes do not play so important a role. Society has not thus far exercised much influence in determining how much a farmer shall pay for a farm, and not until very lately occupied the center of the stage respecting the rate of interest. Society does decide how much the citizen shall pay in taxes, and for reasons and lack of reasons, has put a burden upon the farmer both positively and relatively, quite beyond his ability to pay. This is quite apart from any and all questions pertaining to prices and price levels, mortgages or interest rates.

The chapter which will have the widest use outside the state of Minnesota is undoubtedly the one dealing with the income tax. Careful comparisons are made showing the similarities, differences and operations of the income tax laws of the twenty-three states having them. A calculation is made showing the probable yield of an income tax in Minnesota, were it adopted and properly administered. The argument in favor of such a tax seems wholly convincing—that is to say to any and all except those who would pay more nearly in accordance with ability, were it adopted. (Contrary to a statement made, personal income other than from real estate derived by Wisconsin citizens from outside the state is taxed in Wisconsin.)

Benjamin Horace Hibbard

University of Wisconsin

American Agricultural Policy, by Persia Crawford Campbell, London: P. S. King and Son, Ltd., 1933. Pp. xvii, 304, 10s 6d.

According to the author's own statement in the preface "the only excuse for this book with its large-sounding title is that she held a Rockefeller International Fellowship for two years 1930-31 which enabled her to travel about the United States. . . ." But according to Joseph S. Davis' statement in the foreword "she came well prepared to study American agricultural conditions and policies. For this enterprise she had two years of freedom such as similarly qualified Americans seldom enjoy in their own country."

Judging by the book, Miss Campbell made excellent use of her time and condensed a wealth of information into a relatively small volume.

The book is divided into five rather long chapters, a very short Foreword, Preface, Introduction, and an Appendix which summarizes Outlook Reports. The three page Introduction is mainly quotations to show that the "idea of the family farms treads together the legislative and administrative acts of the last decade in the U.S.A. to make up a National Agricultural Policy."

Chapter I, *The American Farm*, is partly historical but mainly a description of the present, half the chapter being devoted to the different types of farming areas in the United States and the other half to farm family living. The discussion is complete enough to show that there is such a wide diversity of farm work and family living between and within different parts of the country that generalizations about agriculture have little significance except that the family size farm predominates.

Chapter II, *Public Aid to Agriculture*, is primarily an historical account of the creation of the United States Department of Agriculture, the Bureau of Agricultural Economics within the Department, the Land Grant Colleges, the Extension Service, the Experiment Stations, 4-H Clubs, Smith-Hughes teaching, the Federal Farm Loan system, and the Federal Farm Board. In this chapter the emphasis is mainly on the agency rather than its purpose or accomplishments.

Chapter III, *Regulating Production*, gives a good analysis of the purpose and accomplishments of the federal outlook reports which started in 1924 and the failure of the Farm Board to curtail production by asking farmers to produce less. No analysis is made of the attempts to increase production before the philosophy of surplus and overproduction became prevalent or of the relation of the other agencies discussed in Chapter II to production and various forms of regulation.

Chapter IV, *Marketing Policy*, deals almost exclusively with cooperative marketing and, aside from a brief history of agricultural cooperative laws and the boom development of cooperatives under the leadership of Aaron Sapiro, major emphasis is put on the activities of the Farm Board.

Chapter V, *The Present Situation*, weaves together a number of the generalities about agriculture such as number of farm population, average farm income from agriculture, taxes, interest payments, shifts in production and plans for farm relief. The equalization fee, the debenture plan, the domestic allotment plan, and the Federal Farm Board are all briefly discussed. Included in this discussion is brief mention of the democratic platform and Governor Roosevelt's campaign program for agriculture.

This book comes nearer to being an unbiased discussion of the major phases of governmental activity in relation to agriculture than most treatises written by students of the problem permanently residing in this country. However, the author seems to have been unduly influenced by the opinions and literature published by persons employed by agencies whose primary function seems to be to fight the farmer's battles for him. The emphasis given to the Farm Board makes the agricultural marketing act appear as some sort of a permanent climax to agricultural policy instead of perhaps only a passing phenomenon that held the lime-light while vain hopes faded away.

If there is a battle to be fought there must be some opposing forces and these forces are not necessarily in the wrong. But since there are no special pleaders to fight for the welfare of the unorganized consumer and the great mass of city people, it is difficult to discover and analyse the fundamental forces that influence the great mass of American people, to establish the more permanent features of American agricultural policy. Miss Campbell did not become completely lost in the mass of literature written by and for the American farmer and here and there through the

book she incidentally indicates that there may be two sides to most of the questions. For example, after quoting from agricultural leaders and discussing the questions of surpluses and the proposed curtailment of agricultural production as if it were a long-time policy, she doubts if it can be put over because "farmers will have a smaller representation in . . . Congress . . . and they will probably have a less sympathetic public to listen to proposals for higher food prices than in 1929. . . ." Miss Campbell might have gone back of the war years and discussed the situation or literature that dealt with the rising or high cost of living and the back-to-farm movements. It would be interesting to know how a foreigner looks at the present attempts by farm leaders to establish that period as a normal base period for American agricultural prices.

In some cases Miss Campbell goes back much further into history, and, for example, in speaking of "the state Agricultural and Mechanical Colleges usually known as the Land Grant Colleges" she quotes from the Morrill Act of 1862, "when the leading object shall be . . . to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." Although Miss Campbell only quotes, the reader may well pause and consider to what extent the underlying philosophy of promoting the welfare of the industrial classes has and is being carried out by the agricultural colleges.

The title of this book is a little misleading because the book does not cover all aspects of American Agricultural Policy. It is confined almost entirely to a discussion of some of the most plainly visible acts or agencies. Yet it is well worth reading by both people in agriculture and in other activities. Agricultural leaders will find points of view perhaps new to them, while others should welcome the more unbiased presentation of agricultural problems than is found in most current literature.

George M. Peterson

University of California

Ten Years of Federal Intermediate Credits. By Frieda Baird and Claude L. Benner. Washington, D.C.: The Brookings Institution, 1932. Pp. 416. \$2.75.

This valuable work by Miss Frieda Baird and Dr. Claude L. Benner makes its appearance at a time when there is great interest in agricultural credit problems. No time was more opportune for the publication of the results of studies of intermediate credit and the principles presented by the authors should be useful guides in the development of an improved agricultural credit system.

Part I, "Origin and Character of the Agricultural Credits Act" includes in condensed form much of the discussion which is found in Dr. Benner's book "The Federal Intermediate Credit System" published in 1926. This part of the book is a comparatively brief but an excellent discussion of the historical background of the "Agricultural Credit Act of 1923" which provided for the establishment of the federal intermediate credit banks. It also includes a general discussion of the structure of the intermediate credit system.

Part II is entitled "Operating Experiences." It begins with a discussion of the relation of commercial banks to the intermediate credit system

in which the authors explain why the local banks have not drawn heavily on the federal intermediate credit banks in providing funds for farmers in their communities. Livestock credit corporations, which are local agencies rediscounting livestock paper with the intermediate credit banks, are discussed in detail and the authors conclude that most of these agencies and the groups which are responsible for their organization have failed to demonstrate that they can maintain high credit standards. A demoralized banking situation in agricultural regions is mentioned as the most important cause of the development of credit corporations specializing in crop loans. The problem of administration of crop loans is given careful consideration. The authors point out that there have been many failures among credit corporations making crop loans and conclude that "any marked growth in production loans must be accompanied by changes in the organization of local machinery as well as modifications of administrative policies neither of which can be introduced rapidly" (page 232). Direct loans to cooperative marketing associations by the intermediate credit banks are also discussed in detail and the conclusion drawn is that the cooperative marketing associations have been well served but cooperative purchasing associations have benefited only slightly from their services.

Part III deals with "Evolution and Tendencies." The authors point out that in 1930 an amendment to the intermediate credit act eliminated the six months' period as a minimum term for loans and that the banks now may rediscount notes up to three years. In practice, maturities for crop loans are set at harvest time, livestock loans six, nine or twelve months and direct commodity loans less than six months. The authors state that the distinction between commercial credits and loans of intermediate maturities is no longer significant and "the idea of an intermediate credit system has given way to an agricultural credit system. The Intermediate Credit Banks and local credit corporations serve as a commercial banking system for agriculture and not merely as credit institutions to fill a gap between commercial banks and mortgage banks" (page 312). One can agree with this statement but certain qualifications are necessary. Credit corporations must become more flexible in their loan operations and be able to make loans for farm operations on short notice if they are to serve as a commercial banking system.

The disorganized fashion in which agricultural credit corporations and livestock loan companies have been organized resulting in great duplication of territory and efforts is pointed out in a striking way. Another weakness emphasized is the maintenance of uniformly low rates of interest on all types of agricultural and livestock paper. Here the authors emphasize an important factor because the system can not make hazardous crop loans without serious loss unless the credit corporations are allowed to charge rates commensurate with the risks involved.

The book closes with a brief statement of the Farm Credit Administration. Since the publication of this book important legislation has been passed relating to agricultural credit. The farm credit act of 1933 is of particular significance because it provides for the establishment of twelve production credit corporations which are empowered to organize, finance and supervise local production credit associations. The local associations will rediscount the notes of farmers who borrow for general agricultural

purposes, with the federal intermediate credit banks, thus providing the machinery necessary to make these institutions of greater service to agriculture in the future than they have been in the past. Many principles developed in the book should be useful as guides to those responsible for the organization of the new credit institutions. Students of agricultural finance will find this book to be a valuable contribution to the literature on this subject.

E. C. Johnson

University of Minnesota

Britain's New Wheat Policy. Wheat Studies of the Food Research Institute, Vol. IX, No. 9, Stanford University, July, 1933. 46 pp. \$1.00.

At a time when exporting countries are attempting to reach agreement on a method by which wheat supplies can be regulated, it is of some considerable importance to know the methods and results of the wheat policies already in existence in wheat importing countries. The monograph under review reveals the reasons for, the methods invoked, and some of the results of Britain's new wheat policy. It is mainly descriptive and provides a most concise summary of the historical background from the period prior to the repeal of the Corn Laws to the present day, as well as a clear picture of the operation of the Wheat Act.

In the historical section, the need for brevity has somewhat obscured an important consideration. The authors interpret the recent change in British wheat policy first as a farm relief measure and second as the spearhead of a reoriented policy towards British agriculture. In this connection it would appear relevant to have noted that the repeal of the Corn Laws was the spearhead of a reoriented industrial policy. Even though Peel, a Conservative Prime Minister, put through the repeal, it was nineteenth century Liberalism, dominantly industrial and not agricultural in its sympathies, which forced the issue. Today we find a predominantly Conservative Government adapting and proposing policies which in many cases may be said to have been conceived by socialistic philosophy and which in the reviewer's opinion definitely point to a greater measure of self-sufficiency in foodstuffs.

It is estimated, in this study, that the probable effect of the new wheat policy will be to increase domestic production by at least forty-four percent over the 1930-32 average. The authors suggest that this increase will be at the expense of other crops such as barley, oats and sugar beets. This may be the case and, if so, the change from these crops to wheat may not materially affect the pattern of British agriculture. It should be recognized, however, that another result may occur. In the reviewer's opinion, and it is held by many in Great Britain, the United Kingdom should increase her production in many lines of perishable foodstuffs, in the production and marketing of which a decided advantage exists. If the new wheat policy increases the production of a commodity which is very indifferent as to quality, which in five years out of six is seriously affected by adverse weather conditions, which can be bought more cheaply elsewhere; and if this policy thereby discourages the expansion of the area devoted to perishable products, the wisdom of the new policy may be seriously challenged.

Part IV of this study, "Observations on the New Policy," while largely overlooking the above consideration is a most enlightening review of the situation. Herein the authors bring their capable powers of analysis to bear on the subject. Briefly, they state that the British plan has comparative simplicity; there is an absence of monopoly control and price fixing measures; there are no milling quotas as in Germany, France, Italy, Holland and Belgium; and there is no attempt made to invoke compulsory measures of acreage expansion or reduction. The opinion is expressed that "In short, the new measures as they stand represent in most respects an extremely moderate and well studied departure from Britain's long-established wheat policy."

Henry C. Grant

University of Manitoba

Report on the Marketing of Potatoes in Scotland, Department of Agriculture for Scotland. Edinburgh, 1933. 153 pp. 1s.

This report as compared with most marketing studies is unusual both in its approach to the problems involved in the marketing process and the circumstances underlying fluctuations in potato prices, and in the degree to which the marketing processes and the factors relating to the price situation are coordinated. Many of the marketing bulletins in this country primarily are descriptions of the marketing processes, and while a number contain an analysis of costs of certain functional agencies, only a few present as close a tie-up of the phases of distribution and price, as does the above report. The reader is immediately impressed with the definite statements of the objectives of the study and the criteria which are set up to serve as a basis in the subsequent analysis and interpretation of the efficiency of the existing market organization.

The preliminary analysis involves detailed inquiry into the location and volume of production, the demand for Scottish potatoes, both foreign and domestic, the subdivisions of the trade, the movement of the crop, and the organization of the trade.

The volume of Scottish production is the factor of primary importance in determining the level of the wholesale price of the main crop. The seasonal trend of price is not determined by any one factor as the size of the crop. Several factors operate to govern this trend, not the least of which is the market anticipation of the producer, and the proportion of the crop marketed each month.

The authors conclude that the approximate accuracy with which the average price for the season can be predicted suggests that when all local variations and conditions are cancelled out in an average price, the result is therefore normal and orderly under the conditions prevailing. On the other hand individual sales through the season are made at a varying level of prices, resulting in considerable inequality of prices and returns to farmers. Little evidence was found to indicate any serious want of adjustment of the prices realized by growers to the course of trade that might be reasonably anticipated from the knowledge of all the factors involved, nor of undue disparity between the price received by the grower and that paid by the consumer.

The main criticism that is directed against the marketing organization

is that sales are too frequently made in an atmosphere of uncertainty and speculation owing to the lack of precise information as to the ruling facts of the situation. In consequence, the authors recommend with great emphasis that a more complete collection of essential market information be made and a more efficient dissemination among producers and merchants be provided. Such information is necessary if the inequalities, that do happen to exist, are to be corrected. In addition, the producer would possess a basis for a more intelligent determination of acreage and his marketing procedure, the results of which would be a reduction of the annual fluctuations and a prevention of unwarranted and violent seasonal changes of price. A recommendation of the above type is of particular interest to students of marketing in the United States, in view of the recent change in governmental policy with respect to its market news service.

R. W. Cox

University of Minnesota

Report on the Marketing of Livestock in Scotland, Department of Agriculture for Scotland. Edinburgh, 1933, 129 pp., 1s.

The second of the recent marketing reports issued by the Department of Agriculture for Scotland, deals with the marketing of cattle, pigs and sheep. The data relative to the location and volume of Scottish and English demand and of Scottish supplies are presented and discussed in the first three chapters. The completeness of the quantitative determination of these data and of the analysis of their significance is the outstanding feature of the report.

The market organization, with particular reference to the adequacy of the auction method is discussed in Chapter IV. The Scottish market organization is characterized by the wide-spread use of the auction, not only in the large centers where fat stock are gathered for sale, but also in the smaller centers, either of population or supply.

The final chapter is devoted to the course of prices, 1924-1932. Included therein, is a set of diagrams, the function of which is to show the relation between the annual prices, and Scottish supplies and total supplies in Great Britain; the comparison of prices of meat, fat and store stock; the comparison of prices of meats of different grades; and finally, the seasonal trend of prices. The analysis of annual prices indicates that the interaction of the two factors, employment and supplies, tended on the whole to obviate any considerable fall in the prices of meat previous to and including 1929. Beginning in 1930, both factors have been operating together—diminishing demand and increasing supplies—and in consequence, a spectacular fall in meat prices has occurred.

R. W. Cox

University of Minnesota

Research in Transportation in Relation to Agriculture, J. D. Black, Editor. New York: Social Science Research Council. 1933, 94 pp. 75 cents.

This report on transportation of farm products is Number 8 in a series which undertakes to analyze the scope and method of research relating to the economics and sociology of agriculture and rural life. It is issued by

the Advisory Committee on Social and Economic Research in Agriculture.

The field of transportation includes agricultural commodities, together with a large number of other commodities. In this report very few of the units analyzed handle farm products exclusively. However, no student of transportation can leave agriculture out of the analysis, but more important, no student in economics of agriculture can deal effectively with most of the problems of transportation as it relates to agriculture without being more of a specialist in transportation than in agricultural economics. The outline of projects which constitute the major portion of this report was not prepared with any thought in mind that here is a problem of research which applies to agricultural research, but rather with the thought of revealing the extent and nature of the problems in relationship when transportation and agriculture are considered together.

This report assumes a body of readers with the level of understanding of transportation economics about such as possessed by ordinary experiment station workers in the field of agricultural economics and a knowledge of agriculture and agricultural economics about such as possessed by the ordinary beginning research student in transportation economics.

The first section of the report includes a discussion of the scope and methods of study, the characteristics of transportation research and the definition of the field. This is followed by a very complete bibliography of transportation as it applies to agriculture. There are about 10 pages of bibliography and sources of statistical information. The main part of the bulletin consists of 47 project outlines. The first 14 of these project outlines deal with freight rates and their relation to agriculture. The next 7 deal with highway transportation. Three deal with waterways, and the remainder deal with individual commodities as they relate to transportation.

In this latter group there are many projects listed which have been included in the other reports. These project outlines give a rather comprehensive idea of the work to be done along transportation lines. As stated in the introduction, they are not intended to cover the whole field, however. It seems as if some of the projects are rather broad in scope. Perhaps it would be better to divide some of the projects into smaller headings. It would seem that too much emphasis is placed on freight rates to the exclusion of rail service. For instance, insufficient attention is given to freight claims and their prevention, refrigerator facilities and their effect on agriculture, heater service and its effect on agriculture.

If properly used, this report will prove a helpful guide and stimulant in the development of effective research along transportation lines.

H. S. Gabriel

University of Delaware

Studies in Tropical Land Tenure, H. Martin Leake. Port-of-Spain, Trinidad: Government Printing Office, 1933. Pp. 56. 2s.

This study covers the systems of land tenure in the following British colonies: India, West Indies, the Eastern Colonies, East Africa, West Africa, Fiji, Mauritius, and the Sudan.

The author has laid down five tests as a measure of the effect of a sys-

tem of land tenure on the agricultural production in these colonies. They are yield; quality intrinsic to the plant (attaining and maintaining purity of a crop); quality extrinsic to the plant (processes for producing a high grade uniform product); capital requirements; and protection from disease.

It is pointed out by the author that all of these colonies are agricultural and while they have possibilities of industrial development in mineral and oil, they will likely continue agricultural. It is argued that the indigenous nature of the population is not conducive to cooperative effort which is necessary for them to develop their industrial possibilities. He overlooks the possibility of outside capital coming in which when combined with the abundance of cheap labor might develop industry to an unprecedented degree depending, of course, upon the supply of their natural resources.

In spite of the agricultural nature of all of these colonies, there is a great diversity in the system of land tenure. Two systems, the plantation and peasant, are common to all colonies and stand out more prominently than any others.

Modern features of production have put the plantation system into the foreground except in those colonies where the population is too innate to accept modern methods of production. Considerable space is devoted to discussing these two systems of land tenure pointing out the difficulties the peasant system has to overcome in making outside contact through foreign trade which the plantation system does not have. It is stated that a sociological system of land tenure is necessary for progress and that the peasant system does not possess this essential. Consequently, it is argued that any advancement either industrially or socially in the peasant territory can be brought about only by the introduction of new forces through outside contacts. The author points out a pertinent principle when he states that the advancement of an indigenous people is slowed down when they depend on themselves for the necessities and luxuries of life.

The author emphasizes that land tenure is tied up with taxation which is the means through which revenue is secured. A tax on production is not satisfactory because of seasonal production and tax on money values is not acceptable because of a changing value. Long term assessments based on the potential productive capacity of the land have proved successful in some colonies. By such a system, the state receives a part of the incremental values of newly opened territory.

Considerable pains have been taken to trace, rather accurately, the historical development of the land tenure systems in these eight colonies. The summary at the end of the study points out some of the important economic problems confronting these colonies.

L. F. Garey

University of Minnesota

NEWS ITEMS

Annual Meeting

The twenty-fourth annual meeting of the American Farm Economic Association will be held at Philadelphia, December 27, 28 and 29, with headquarters at the Broadwood Hotel. The program was not completed in time for this issue of the JOURNAL but will be sent members about December 1.

Agricultural Adjustment Administration

More than one million cotton growers throughout the South cooperated in the cotton reduction campaign. August 23 was set as the deadline for accomplishing the destruction contracted for. It was announced that about 10,300,000 acres or 25.3 percent of the acreage in cultivation on July 1 were involved. Total cash payments are expected to amount to about \$110,000,000. A processing tax of 4.2 cents per pound was levied effective August 1.

Success of the wheat campaign was assured before the signing of actual contracts began in late August following the Secretary's announcement of the acreage reduction required of cooperating growers for 1934. Benefit payments were figured at 28 cents per bushel on 54 percent of the 5-year average production (1928-32) from which the small cost of local committee work would have to be paid by the farmer. The sign-up of applications for contracts was enthusiastic. The farmer is free to sell his 1933 crop as he sees fit; the benefit check is a clear addition to income. The farmer agrees to plant for 1934 harvest at least 54 acres of wheat for every 100 acres of previous average, but not more than 85 acres, and to refrain from using the 15 acres kept out of wheat under the contract for any surplus crop or crop nationally sold.

The emergency hog marketing campaign went into operation on August 23. The Administration undertook to buy prior to October 1 a maximum of 4,000,000 normal healthy pigs of 25-100 pounds in weight, and 1,000,000 sows soon to farrow, each weighing at least 240 pounds, according to a schedule of prices estimated to compensate the producer who would prefer to sell rather than fatten the pigs. Market price without dockage for weight was offered for the sows, plus a bonus of \$4.00 per head. The products were to be kept out of competition with products in normal trade, the National Emergency Relief Administration to get most of the meat for the use of needy families. It was estimated that about 650,000,000 pounds live weight would be removed from the market this fall and that the reduction of marketings for the coming marketing year would approximate 1,800,000,000 pounds. The plan is recognized as a first step in a comprehensive plan in process of development.

Cigar-tobacco growers have cooperated in reducing production of 1933. Growers of the wrapper type in Georgia and Florida reduced their harvest about 23 percent by leaving on the stalk the four top leaves. The estimated reduction accomplished under contracts with growers of the filler and binder types in four principal districts amount to about 20 percent. Payments to cooperating growers amount to more than \$2,500,000.

The Chicago milk marketing agreement approved and signed by Secretary Wallace on July 29 was the first of a series of agreements proposed under the Agricultural Adjustment Act. This agreement was designed

to stabilize prices, practices, and conditions in the Chicago milk shed, and one of its objectives is to increase the income of some 18,000 milk producers by about \$10,000 a day. Similar agreements for Philadelphia and Detroit became effective in late August.

The California peach agreement signed August 15, the second of the marketing agreements, provides a minimum price of \$20 a ton or its equivalent for cling peaches (No. 1's) and the pack is limited to 218,000 tons. About 4,000 peach growers and 50 canners are affected by the agreement.

Among the more important appointments announced during the three months June-August were the following:

General William I. Westervelt, of Chicago, as director of processing and marketing.

Dr. A. G. Black, of Iowa State College, as acting chief, corn-hog production section.

Dr. J. B. Hutson, tobacco specialist in the foreign service, Bureau of Agricultural Economics, as acting chief of the tobacco section.

Mr. Frank A. Theis, of Kansas City, Missouri, as chief of the wheat processing and marketing division.

Mr. Gordon C. Corbaley, of New York, New York, as adviser on food distribution problems.

Ex-Governor T. G. Bilbo, of Mississippi, to have charge of assembling current information records.

Mr. H. R. Tolley, Director of the Giannini Foundation, Berkeley, California, as chief of the special crops section.

Hon. J. N. Norton, of Nebraska, as field representative of the production division.

Mr. Carroll W. Dunning, of Portland, Oregon, as executive assistant to General Westervelt.

Hon. Victor Christgau, of Minnesota, as executive assistant to Mr. Davis, chief of the production division.

Dr. Clyde L. King, of University of Pennsylvania, as chief of the dairy section.

Mr. James C. Lanier, of Greenville, North Carolina, as expert in charge of processing and marketing tobacco.

Dr. Frederick C. Howe, of Cleveland, Ohio, as consumers' counsel.

New Project of the Institute of Economics

The Institute of Economics of Brookings Institution has received a special grant of funds from the Rockefeller Foundation to conduct "A Concurrent Study of the Operation of the Agricultural Adjustment Act." This work will be under the immediate direction of E. G. Nourse, J. D. Black, and J. S. Davis, each giving a portion of his time to it. The staff will consist of two groups—one working in Washington and the other in the field.

The Washington group includes Harold B. Rowe, formerly of Massachusetts State College, as administrative assistant to the directors of the study; Sherman Johnson, of South Dakota State College, specializing on wheat; Fred Lininger, of Pennsylvania State College, on dairy; D. A. FitzGerald, of Iowa State College, on livestock; H. I. Richards, formerly of the Federal Farm Board, on cotton; and Virgil Gilman, formerly of Montana State College, working on non-basic commodities and general contacts. The field force consists of "resident observers" who act as channels of contact between the Washington organization and the Experiment Station and Extension groups in the states where adjustment activities

are most important. They include also a limited number who are located at market centers.

This study is strongly endorsed by the Secretary and Assistant Secretary of Agriculture, the Administrative Council of the Agricultural Adjustment Administration, and the Director of Extension Service. With one exception it has met the cordial support of the Experiment Station and Extension directors in the states, and has received the generous cooperation of the various departments of agricultural economics and farm management. The purpose of the study is to apply something approximating a laboratory technique to the study of this great economic experiment.

The World's Grain Exhibition and Conference held at Regina, Saskatchewan, July 25 to August 6, proved to be the largest event ever held in connection with any one field of science in Canada. Over 500 official delegates and agriculturists registered for the Conference sessions, and over 200,000 visited the Exhibition. More than two hundred papers were read, and the conference sessions were well attended. Technical sessions covered all fields of science in connection with grain production; the open sessions dealt mainly with the economics of marketing. Well-known authorities presented papers on the present world wheat situation and trends, import cereal requirements, control production, merchandising methods, financing and transportation. Considerable time was given over to discussion, and contrasting viewpoints were brought out by representatives of the different countries present. The complete proceedings of the World's Grain Exhibition and Conference will be published in the late fall by the Canadian Society of Technical Agriculturists at Ottawa.

The Canadian Society of Agricultural Economics held its Annual Meeting at Regina during the World's Grain Conference. Dr. W. V. Longley, Agricultural College, Truro, Nova Scotia, was elected President, H. C. Bois, Rural Economics Branch, Department of Agriculture, Quebec, Vice-President, and J. Coke, Economics Branch, Department of Agriculture, Ottawa, Secretary.

Work of the Bureau of Agricultural Economics has been curtailed and modified because of the reduction of funds available for the fiscal year 1933-34. Every division has been affected. A few lines of work have been suspended; there have been shifts of personnel within the Bureau, transfers to other units, and some furloughs, but the most generally used services are being maintained.

The annual national outlook conference sponsored by the U. S. Department of Agriculture will be held in Washington, D.C., October 30-November 4, 1933 instead of in January, 1934. Suggestion for advancing the time of the conference and other changes in the outlook program were made by a number of state representatives at the conference last January.

As part of a reorganization at West Virginia University all courses in farm economics formerly offered in the College of Agriculture have been transferred to and will be offered in the Department of Economics, College of Arts and Sciences. It was found that the work could be carried on

with two fewer instructors than formerly. Experiment station and extension work will remain in the College of Agriculture.

The Intermountain Economic Conference of which Mr. E. C. van Diest of Colorado Springs, is President, held its annual session at Colorado Springs, Colorado, September 20-23. The keynote of the conference was the new plan of national economics.

Mr. C. R. Arnold, of Ohio State University, is on leave of absence to serve as assistant governor of the production credit section of the Farm Credit Administration.

Mr. L. H. Bean has been assigned by the Bureau of Agricultural Economics to work in the Agricultural Adjustment Administration.

Mr. R. C. Bentley, Iowa State College, has been filling a short appointment this summer with the Farm Credit Administration.

Mr. Lauren H. Brown, formerly on the farm management staff, University of Illinois and last year on the staff of Connecticut Agricultural College, is an appraiser with the Federal Land Bank of Springfield, Mass.

Mr. Wendell Calhoun has been placed in charge of the market news work in fruits and vegetables of the Philadelphia branch office, Bureau of Agricultural Economics.

Mr. G. Douglas Collins, Jr., M.S., University of Tennessee, 1932, has returned to the University as temporary Research Assistant in Agricultural Economics.

Mr. C. C. Conser, Marketing Specialist at the Montana Experiment Station, is now with the Wheat Section, Agricultural Adjustment Administration, Washington, D.C.

Mr. W. P. Cotton, Department of Agricultural Economics, University of Tennessee, is engaged on a study of forest economics problems in Tennessee.

Mr. Ben G. Duncan and Mr. Henry W. Spielman, 1933 graduates, Oklahoma A. & M. College, have recently received fellowships under the auspices of the Brookings Institution, and will be stationed there during the year 1933-34 as resident field observers studying operation of the Agricultural Adjustment Act among Oklahoma farmers. Mr. Duncan will study the work in the wheat area, while Mr. Spielman will report on the cotton sections.

Mr. A. M. Eberle has been appointed director of the extension service, South Dakota College of Agriculture.

Dr. Mordecai J. B. Ezekiel, economic adviser to Secretary Wallace, will represent the U. S. Department of Agriculture on the Central Statistical

Board created by President Roosevelt to formulate standards for and to effect coordination of the statistical services of the Federal Government incident to the purposes of the National Recovery Act. L. H. Bean, economic adviser to the Agricultural Adjustment Administration, was named as alternate.

Messrs. W. T. Ferrier, Roy M. Gilreast, H. P. Hanson and Arthur True, who have been taking graduate work in agricultural economics at the University of Minnesota, are with the Federal Land Bank at St. Paul.

Mr. O. M. Fuller has resigned from his position as economist and farm management specialist at North Dakota Agricultural College to take up work with an insurance company, and is now located in Sioux City, Iowa.

Mr. J. K. Galbraith has accepted a teaching position in Agricultural Economics at the University of California Farm at Davis, California.

Mr. J. Barnard Gibbs, assistant agricultural commissioner at Belgrade, Yugoslavia, since October, 1930, returned to Washington, D.C., July 12.

Dr. Roy L. Gillett, agricultural statistician for New York State, has been elected president of the Federal Business Association of Albany, N.Y.

Mr. C. C. Hardenbergh, of Stone Ridge, N.Y., a voluntary crop reporter for 50 years, resigned in June because of ill health. Regularity as well as length of period has characterized Mr. Hardenbergh's service.

Mr. Marshall D. Harris, a member of the Farm Management staff at the University of Illinois, has been appointed resident observer for the State of Illinois for the concurrent study of the operation of the Agricultural Adjustment Act, which is being carried on by the Institute of Economics of the Brookings Institution, Washington, D.C.

Dr. Van B. Hart has been designated acting director of the agricultural extension service in New York during the absence of L. R. Simon on account of illness.

Congressman Gilbert N. Haugen, of Iowa, died on July 18, after 34 years of conspicuous service for agriculture in the House of Representatives. His efforts in behalf of farmers through molding and support of legislation and appropriations have been somewhat overshadowed by the attention given in the last decade to the farm relief measure which he helped push through Congress twice.

Professor R. E. Hudelson, Associate Chief, Farm Organization and Management, University of Illinois and acting State manager of the wheat production control campaign for the State of Illinois, has been appointed Assistant Dean of the College of Agriculture, University of Illinois, to succeed Fred H. Rankin, who will be retired September 1 after 32 years of service with the College. As Assistant Dean, Professor Hudelson will be

in charge of courses and student affairs in the College of Agriculture, and in addition will direct the work in exhibits, tours, short courses, and similar activities.

Dr. W. M. Jardine resigned as Minister to Egypt and returned to the United States in September.

Dr. E. L. Kirkpatrick has been appointed to the staff of the Federal Emergency Relief Administration and will serve as rural relief analyst and advisor on rural relief problems in the research and statistical division of the administration. The University of Wisconsin has granted him leave of absence for this service.

Mr. H. W. Leonard, who received his M.S.A. degree in Farm Management at Purdue University last summer, accepted a position with the Metropolitan Life Insurance Company to manage a group of farms in southwestern Missouri effective August 15.

Dr. F. F. Lininger has been granted leave of absence from Penn State College for the first semester, to work with the Brookings Institution, Washington, D.C.

Mr. V. S. Malitsky, who was a fellow of the Brookings Institution last year, has returned to the University of Minnesota, where he will continue his graduate work.

Dr. Albert Mighell, Iowa State College, has been granted leave of absence to work as resident observer for Iowa with the Institute of Economics on its concurrent study of the operation of the Agricultural Adjustment Act.

Dr. W. G. Murray, Iowa State College, has been filling a short appointment this summer with the Farm Credit Administration.

Mr. Lawrence Myers has been acting economic adviser to the Cotton Administration.

Mr. P. K. Norris, cotton specialist who has been studying cotton production and marketing in Egypt and adjacent countries of Africa, returned to Washington, D.C., in June.

Mr. Edward C. Parker has been placed in charge of the Grain Division, Bureau of Agricultural Economics, effective August 1. For several years he was in charge of hay standardization and inspection work of the Bureau's Hay, Feed and Seed Division.

Mr. E. C. Paxton, agricultural commissioner at Sidney, Australia, for nearly three years, has returned to the Bureau of Agricultural Economics, Washington, D.C., and has been designated liaison officer between the Division of Crop and Livestock Estimates and the Agricultural Adjustment

Administration. Mr. Paxton was formerly agricultural statistician for the State of Kansas.

Mr. Glenn S. Ray who has been agricultural commissioner at Buenos Aires for the past two and one-half years has returned to Columbus, Ohio, as agricultural statistician for Ohio.

Mr. Harry G. Russell, a member of the Farm Management staff at the University of Illinois, recently resigned to accept a position with the Doane Agricultural Service of St. Louis.

Messrs. H. D. Seudder, A. S. Burrier, and G. W. Kuhlman of the department of farm management at the Oregon State Agricultural College spent the summer vacation period as appraisers for the Federal Land Bank of Spokane.

Mr. H. E. Selby, associate economist in the department of farm management, Oregon State Agricultural College, has been granted sabbatical leave for graduate study in agricultural economics at Cornell University.

Dr. T. W. Schultz has been appointed Acting Chief of the Agricultural Economics section of Iowa Agricultural Experiment Station during the period of absence of Dr. A. G. Black in Washington, D.C.

Mr. Ranbir Singh, a former member of the Department of Agricultural Economics, University of Illinois, left late in July for his home in Bhasaur, Patiala State, Punjab, India, where he will be engaged in Agricultural Economic work. Mr. Singh received his B.S. degree at the University of California in 1929, M.S. at the University of Illinois in 1930, and his Ph.D. at the University of Illinois in 1933.

Mr. N. J. Stanford, Department of Agricultural Economics, University of Tennessee, in cooperation with the Bureau of Agricultural Economics, is making an inventory of the varieties of cotton grown in each community of Tennessee.

Professor E. A. Starch has been made Head of the Department of Agricultural Economics of the Montana Experiment Station.

Dr. P. H. Stephens, Oklahoma A. & M. College, and Dr. W. E. Grimes, Kansas State Agricultural College, acted as members of a committee representing Oklahoma, Kansas, Texas, Colorado, and New Mexico in a survey of drought damages in an area comprising parts of each of these States within a radius of about 140 miles from Guymon, Oklahoma.

Mr. Wallace Sullivan, formerly Itinerate Farm Adviser in California has returned to the University of California in the capacity of Extension Specialist in Farm Management.

Mr. Jesse W. Tapp, recently with National Investors Corporation, of New York City, is now with the special crops section, Agricultural Adjustment Administration, in Washington, D.C.

Dr. C. C. Taylor, of the Foreign Agricultural Service Division, Bureau of Agricultural Economics, stationed at Pretoria, South Africa, returned to headquarters in Washington, D.C., early in August.

Dr. Henry C. Taylor has been appointed permanent delegate of the United States to the International Institute of Agriculture at Rome, and sailed with his family for Italy on August 22.

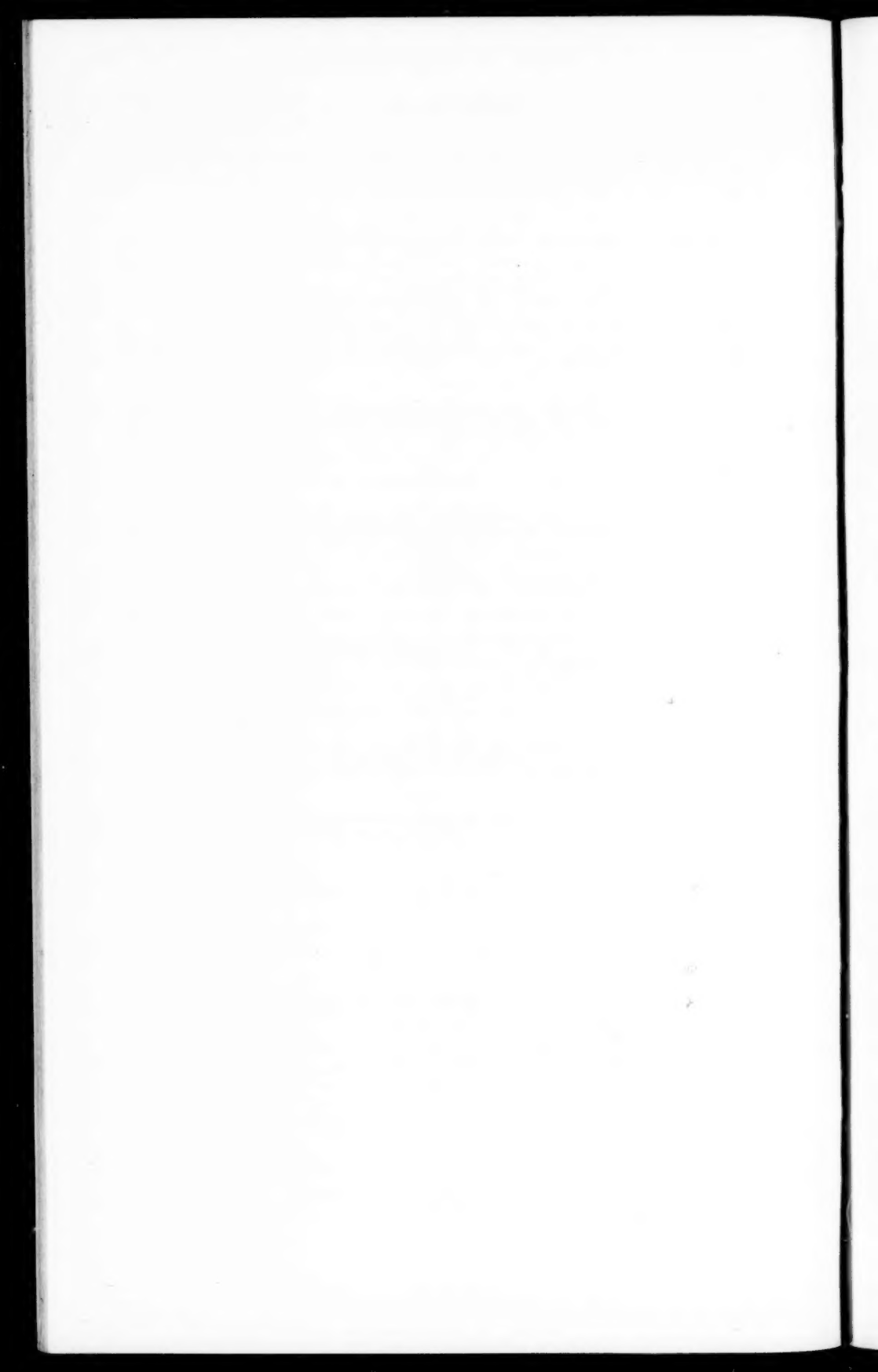
Mr. W. D. Termohlen has been given a six months' leave of absence from Iowa State College to work in the special crops section, Agricultural Adjustment Administration.

Dr. Frederick V. Waugh has been transferred from Boston to Washington, D.C., where he is doing research and service work on the relation of prices to consumption, and the effect of processing taxes upon prices and consumption.

Mr. Hazen Whalen, who received a master's degree in Agricultural Economics from the University of Illinois in June, 1933, has been named land appraiser for the Federal Land Bank of St. Louis, Missouri, and will have charge of work in southern Illinois.

Mr. F. R. Wilcox has returned to the Agricultural Extension Service of the University of California after a nine months' leave of absence. During his absence from the University Mr. Wilcox was acting General Manager of the United Prune Growers, a new California cooperative organization.

Dr. E. C. Young, Professor in Farm Management at Purdue University, was appointed Assistant Dean of the Graduate School effective September 1.



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